FINAL MASTER THESIS

INDUSTRIAL TECHNOLOGY ENGINEERING

# ESTIMATION OF THE ACCELERATION RESPONSE OF A BUILDING UNDER EARTHQUAKE EXCITATION

## ANNEX


**Autor:** Alejandro Copetudo Espinosa

**Director:** Ting-Yu Hsu


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NATIONAL TAIWAN UNIVERSITY OF SCIENCE AND TECHNOLOGY


台科大
TAIWAN TECH

# INDEX

# 1. ANALISIS RESSULTS TABLE

| JOINT | EARTHQUAKE | $U_1$ (cm/s$^2$) | $U_2$ (cm/s$^2$) | $U_{max}$ (cm/s$^2$) |
|---|---|---|---|---|
| 365 | TH-48-19 | -250,491 | -358,325 | 358,325 |
| 396 | TH-48-19 | -214,025 | -268,036 | 268,036 |
| 427 | TH-48-19 | -162,351 | -176,93 | 176,93 |
| 488 | TH-48-19 | -124,427 | -116,897 | 124,427 |
| 517 | TH-48-19 | 391,806 | 272,983 | 391,806 |
| 548 | TH-48-19 | 292,391 | 210,687 | 292,391 |
| 579 | TH-48-19 | -245,234 | -156,186 | 245,234 |
| 610 | TH-48-19 | -186,619 | -127,855 | 186,619 |
| 365 | TH-48-25 | -60,315 | -86,045 | 86,045 |
| 396 | TH-48-25 | -39,838 | -60,846 | 60,846 |
| 427 | TH-48-25 | 31,875 | 40,535 | 40,535 |
| 488 | TH-48-25 | 29,053 | 35,343 | 35,343 |
| 517 | TH-48-25 | 68,156 | 100,404 | 100,404 |
| 548 | TH-48-25 | 50,957 | 75,233 | 75,233 |
| 579 | TH-48-25 | 44,047 | 50,142 | 50,142 |
| 610 | TH-48-25 | 37,548 | 39,852 | 39,852 |
| 365 | TH-48-28 | 284,059 | 469,407 | 469,407 |
| 396 | TH-48-28 | -176,215 | -317,856 | 317,856 |
| 427 | TH-48-28 | -129,338 | -175,51 | 175,51 |
| 488 | TH-48-28 | 191,883 | 143,146 | 191,883 |
| 517 | TH-48-28 | 296,861 | 274,058 | 296,861 |
| 548 | TH-48-28 | -195,119 | -167,984 | 195,119 |
| 579 | TH-48-28 | 261,472 | 91,763 | 261,472 |
| 610 | TH-48-28 | 274,855 | 90,823 | 274,855 |
| 365 | TH-48-43 | -7,702 | -9,028 | 9,028 |
| 396 | TH-48-43 | -5,793 | -6,694 | 6,694 |
| 427 | TH-48-43 | -4,36 | -4,54 | 4,54 |
| 488 | TH-48-43 | 4,977 | 3,216 | 4,977 |
| 517 | TH-48-43 | -12,802 | -10,821 | 12,802 |
| 548 | TH-48-43 | 8,825 | 8,589 | 8,825 |
| 579 | TH-48-43 | -7,581 | -6,202 | 7,581 |
| 610 | TH-48-43 | -6,027 | -4,93 | 6,027 |
| 365 | TH-48-54 | 393,433 | 209,945 | 393,433 |
| 396 | TH-48-54 | 266,749 | 152,827 | 266,749 |

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|---|---|---|---|---|
| 427 | TH-48-54 | 170,145 | 103,412 | 170,145 |
| 488 | TH-48-54 | 165,742 | 55,922 | 165,742 |
| 517 | TH-48-54 | 343,311 | 148,314 | 343,311 |
| 548 | TH-48-54 | 237,516 | 113,364 | 237,516 |
| 579 | TH-48-54 | 207,94 | 77,978 | 207,94 |
| 610 | TH-48-54 | 238,242 | 51,951 | 238,242 |
| 365 | TH-48-57 | -121,258 | -146,617 | 146,617 |
| 396 | TH-48-57 | -94,46 | -97,263 | 97,263 |
| 427 | TH-48-57 | -57,095 | -48,893 | 57,095 |
| 488 | TH-48-57 | 75,148 | 58,614 | 75,148 |
| 517 | TH-48-57 | 129,014 | 86,151 | 129,014 |
| 548 | TH-48-57 | 76,028 | 63,033 | 76,028 |
| 579 | TH-48-57 | 66,68 | 42,772 | 66,68 |
| 610 | TH-48-57 | 81,593 | 48,119 | 81,593 |
| 365 | TH-48-58 | 51,866 | 37,72 | 51,866 |
| 396 | TH-48-58 | 26,903 | 25,379 | 26,903 |
| 427 | TH-48-58 | -19,859 | -12,98 | 19,859 |
| 488 | TH-48-58 | -22,346 | -7,519 | 22,346 |
| 517 | TH-48-58 | -39,87 | -14,789 | 39,87 |
| 548 | TH-48-58 | -18,652 | -10,486 | 18,652 |
| 579 | TH-48-58 | -21,319 | -6,918 | 21,319 |
| 610 | TH-48-58 | -29,572 | -5,062 | 29,572 |
| 365 | TH-48-6 | 21,093 | 26,64 | 26,64 |
| 396 | TH-48-6 | 17,373 | 19,981 | 19,981 |
| 427 | TH-48-6 | 13,836 | 13,634 | 13,836 |
| 488 | TH-48-6 | 12,474 | 7,71 | 12,474 |
| 517 | TH-48-6 | -34,182 | -19,221 | 34,182 |
| 548 | TH-48-6 | -28,761 | -14,677 | 28,761 |
| 579 | TH-48-6 | -22,067 | -10,096 | 22,067 |
| 610 | TH-48-6 | 16,417 | 8,446 | 16,417 |
| 365 | TH-48-69 | 126,082 | 114,586 | 126,082 |
| 396 | TH-48-69 | 98,571 | 78,891 | 98,571 |
| 427 | TH-48-69 | 73,287 | 55,98 | 73,287 |
| 488 | TH-48-69 | -58,014 | -49,604 | 58,014 |
| 517 | TH-48-69 | -201,983 | -134,181 | 201,983 |
| 548 | TH-48-69 | -144,646 | -92,141 | 144,646 |
| 579 | TH-48-69 | -102,226 | -66,311 | 102,226 |
| 610 | TH-48-69 | -86,906 | -62,245 | 86,906 |
| 365 | TH-48-83 | 285,413 | 370,672 | 370,672 |
| 396 | TH-48-83 | 142,501 | 250,04 | 250,04 |
| 427 | TH-48-83 | -147,794 | -139,617 | 147,794 |
| 488 | TH-48-83 | -176,973 | -89,753 | 176,973 |

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|---|---|---|---|---|
| 517 | TH-48-83 | -288,138 | -215,41 | 288,138 |
| 548 | TH-48-83 | 159,109 | 144,679 | 159,109 |
| 579 | TH-48-83 | 201,251 | 97,158 | 201,251 |
| 610 | TH-48-83 | 230,79 | 114,761 | 230,79 |
| 365 | TH-71-120 | 59,499 | 165,149 | 165,149 |
| 396 | TH-71-120 | -43,001 | -116,162 | 116,162 |
| 427 | TH-71-120 | 26,52 | 68,9 | 68,9 |
| 488 | TH-71-120 | 37,469 | 26,782 | 37,469 |
| 517 | TH-71-120 | 71,669 | 112,202 | 112,202 |
| 548 | TH-71-120 | 44,667 | 79,099 | 79,099 |
| 579 | TH-71-120 | 34,689 | 45,82 | 45,82 |
| 610 | TH-71-120 | 45,854 | 18,859 | 45,854 |
| 365 | TH-71-136 | 14,806 | 40,29 | 40,29 |
| 396 | TH-71-136 | 10,424 | 27,305 | 27,305 |
| 427 | TH-71-136 | -8,444 | -14,668 | 14,668 |
| 488 | TH-71-136 | -7,565 | -7,976 | 7,976 |
| 517 | TH-71-136 | 19,81 | 12,99 | 19,81 |
| 548 | TH-71-136 | -11,56 | -6,486 | 11,56 |
| 579 | TH-71-136 | -11,935 | -2,931 | 11,935 |
| 610 | TH-71-136 | 11,571 | 3,078 | 11,571 |
| 365 | TH-71-17 | 1753,498 | 2269,616 | 2269,616 |
| 396 | TH-71-17 | -1621,677 | -1535,339 | 1621,677 |
| 427 | TH-71-17 | -1043,57 | -972,215 | 1043,57 |
| 488 | TH-71-17 | -677,326 | -676,334 | 677,326 |
| 517 | TH-71-17 | -2400,28 | -3253,273 | 3253,273 |
| 548 | TH-71-17 | -1965,639 | -2458,586 | 2458,586 |
| 579 | TH-71-17 | 1716,966 | 1622,904 | 1716,966 |
| 610 | TH-71-17 | 1169,864 | 978,727 | 1169,864 |
| 365 | TH-71-19 | 384,488 | 716,503 | 716,503 |
| 396 | TH-71-19 | 291,596 | 492,625 | 492,625 |
| 427 | TH-71-19 | -149,516 | -278,493 | 278,493 |
| 488 | TH-71-19 | -85,618 | -123,716 | 123,716 |
| 517 | TH-71-19 | -311,034 | -368,11 | 368,11 |
| 548 | TH-71-19 | -244,619 | -247,951 | 247,951 |
| 579 | TH-71-19 | -184,216 | -131,45 | 184,216 |
| 610 | TH-71-19 | -117,652 | -72,039 | 117,652 |
| 365 | TH-71-20 | -987,884 | -2331,138 | 2331,138 |
| 396 | TH-71-20 | -753,918 | -1650,758 | 1650,758 |
| 427 | TH-71-20 | -453,354 | -1000,605 | 1000,605 |
| 488 | TH-71-20 | -306,612 | -370,135 | 370,135 |
| 517 | TH-71-20 | -1131,514 | -1663,38 | 1663,38 |
| 548 | TH-71-20 | -892,216 | -1202,042 | 1202,042 |

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|---|---|---|---|---|
| 579 | TH-71-20 | 615,52 | 737 | 737 |
| 610 | TH-71-20 | 376,074 | 417,972 | 417,972 |
| 365 | TH-71-21 | 515,403 | 376,424 | 515,403 |
| 396 | TH-71-21 | 419,095 | 263,925 | 419,095 |
| 427 | TH-71-21 | 288,16 | 171,618 | 288,16 |
| 488 | TH-71-21 | -154,921 | -101,199 | 154,921 |
| 517 | TH-71-21 | 779,318 | 418,262 | 779,318 |
| 548 | TH-71-21 | 647,445 | 313,194 | 647,445 |
| 579 | TH-71-21 | 479,433 | 209,55 | 479,433 |
| 610 | TH-71-21 | 296,11 | 152,683 | 296,11 |
| 365 | TH-71-23 | -786,111 | -1115,182 | 1115,182 |
| 396 | TH-71-23 | -648,195 | -779,544 | 779,544 |
| 427 | TH-71-23 | -476,218 | -447,721 | 476,218 |
| 488 | TH-71-23 | -354,411 | -212,893 | 354,411 |
| 517 | TH-71-23 | -1243,942 | -711,747 | 1243,942 |
| 548 | TH-71-23 | -1038,753 | -560,355 | 1038,753 |
| 579 | TH-71-23 | -785,675 | -417,722 | 785,675 |
| 610 | TH-71-23 | 521,523 | 275,652 | 521,523 |
| 365 | TH-71-24 | 127,085 | 147,122 | 147,122 |
| 396 | TH-71-24 | 97,278 | 100,457 | 100,457 |
| 427 | TH-71-24 | 58,013 | 55,181 | 58,013 |
| 488 | TH-71-24 | -37,437 | -27,275 | 37,437 |
| 517 | TH-71-24 | -167,524 | -98,55 | 167,524 |
| 548 | TH-71-24 | -130,845 | -70,804 | 130,845 |
| 579 | TH-71-24 | -84,105 | -42,914 | 84,105 |
| 610 | TH-71-24 | 41,683 | 20,992 | 41,683 |
| 365 | TH-71-36 | -43,346 | -79,764 | 79,764 |
| 396 | TH-71-36 | -37,659 | -54,377 | 54,377 |
| 427 | TH-71-36 | -31,139 | -29,458 | 31,139 |
| 488 | TH-71-36 | -24,53 | -15,713 | 24,53 |
| 517 | TH-71-36 | 73,79 | 83,668 | 83,668 |
| 548 | TH-71-36 | -67,844 | -60,062 | 67,844 |
| 579 | TH-71-36 | -53,53 | -41,76 | 53,53 |
| 610 | TH-71-36 | -37,561 | -25,035 | 37,561 |
| 365 | TH-71-95 | 13,421 | 11,417 | 13,421 |
| 396 | TH-71-95 | 9,044 | 7,638 | 9,044 |
| 427 | TH-71-95 | -5,053 | -4,596 | 5,053 |
| 488 | TH-71-95 | 5,114 | 3,083 | 5,114 |
| 517 | TH-71-95 | 14,044 | 7,812 | 14,044 |
| 548 | TH-71-95 | 10,271 | 5,806 | 10,271 |
| 579 | TH-71-95 | 8,289 | 3,784 | 8,289 |
| 610 | TH-71-95 | 7,913 | 2,734 | 7,913 |

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| 365 | TH-50-105 | -12,4272 | 28,1700 | 28,1700 |
| 396 | TH-50-105 | -8,9189 | 19,6998 | 19,6998 |
| 427 | TH-50-105 | -5,3975 | 11,2167 | 11,2167 |
| 488 | TH-50-105 | -5,9039 | 6,3027 | 6,3027 |
| 517 | TH-50-105 | 19,6494 | -19,2320 | 19,6494 |
| 548 | TH-50-105 | 14,7396 | -13,1206 | 14,7396 |
| 579 | TH-50-105 | 11,8610 | -8,5236 | 11,8610 |
| 610 | TH-50-105 | -9,0134 | 5,7182 | 9,0134 |
| 365 | TH-50-20 | 5,2470 | -6,5047 | 6,5047 |
| 396 | TH-50-20 | 4,0541 | -4,8978 | 4,8978 |
| 427 | TH-50-20 | 2,8481 | -3,3671 | 3,3671 |
| 488 | TH-50-20 | 2,4442 | -3,2254 | 3,2254 |
| 517 | TH-50-20 | 11,3445 | -13,4572 | 13,4572 |
| 548 | TH-50-20 | 9,2573 | -9,9093 | 9,9093 |
| 579 | TH-50-20 | 6,6141 | -6,3979 | 6,6141 |
| 610 | TH-50-20 | -3,7710 | 3,3516 | 3,7710 |
| 365 | TH-50-21 | -16,2341 | 18,6210 | 18,6210 |
| 396 | TH-50-21 | -14,7158 | 14,2804 | 14,7158 |
| 427 | TH-50-21 | -12,7386 | 10,0657 | 12,7386 |
| 488 | TH-50-21 | -10,6308 | 6,1681 | 10,6308 |
| 517 | TH-50-21 | -40,7900 | 13,8246 | 40,7900 |
| 548 | TH-50-21 | -34,5860 | 10,9093 | 34,5860 |
| 579 | TH-50-21 | -26,7986 | 8,0682 | 26,7986 |
| 610 | TH-50-21 | -18,4539 | 6,4995 | 18,4539 |
| 365 | TH-50-41 | 4,5570 | -3,6151 | 4,5570 |
| 396 | TH-50-41 | 3,9233 | -3,0335 | 3,9233 |
| 427 | TH-50-41 | -3,2239 | 2,1369 | 3,2239 |
| 488 | TH-50-41 | -2,7126 | 2,0202 | 2,7126 |
| 517 | TH-50-41 | 6,8340 | -7,1479 | 7,1479 |
| 548 | TH-50-41 | 5,7848 | -5,6962 | 5,7848 |
| 579 | TH-50-41 | 4,4984 | -4,2646 | 4,4984 |
| 610 | TH-50-41 | -3,4041 | 2,8345 | 3,4041 |
| 365 | TH-50-48 | -0,0101 | 0,0255 | 0,0255 |
| 396 | TH-50-48 | -0,0063 | 0,0181 | 0,0181 |
| 427 | TH-50-48 | -0,0058 | 0,0107 | 0,0107 |
| 488 | TH-50-48 | 0,0078 | -0,0042 | 0,0078 |
| 517 | TH-50-48 | 0,0120 | -0,0105 | 0,0120 |
| 548 | TH-50-48 | 0,0076 | -0,0072 | 0,0076 |
| 579 | TH-50-48 | -0,0081 | 0,0040 | 0,0081 |
| 610 | TH-50-48 | 0,0101 | -0,0049 | 0,0101 |
| 365 | TH-50-50 | -10,9366 | 17,6893 | 17,6893 |
| 396 | TH-50-50 | -7,7554 | 14,4681 | 14,4681 |

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| 427 | TH-50-50 | -3,9341 | 11,4783 | 11,4783 |
| 488 | TH-50-50 | -3,7449 | 8,6760 | 8,6760 |
| 517 | TH-50-50 | -21,1596 | 29,3324 | 29,3324 |
| 548 | TH-50-50 | 14,2544 | -22,8116 | 22,8116 |
| 579 | TH-50-50 | 11,4089 | -16,8846 | 16,8846 |
| 610 | TH-50-50 | 7,5582 | -11,7551 | 11,7551 |
| 365 | TH-50-52 | -4,2233 | 2,2113 | 4,2233 |
| 396 | TH-50-52 | 2,1508 | -3,0050 | 3,0050 |
| 427 | TH-50-52 | -2,1863 | 1,2136 | 2,1863 |
| 488 | TH-50-52 | 2,2901 | -1,6481 | 2,2901 |
| 517 | TH-50-52 | -7,5410 | 4,5605 | 7,5410 |
| 548 | TH-50-52 | -5,4772 | 3,4064 | 5,4772 |
| 579 | TH-50-52 | 4,3328 | -2,8480 | 4,3328 |
| 610 | TH-50-52 | -3,4436 | 2,0786 | 3,4436 |
| 365 | TH-50-62 | -19,8462 | 31,8532 | 31,8532 |
| 396 | TH-50-62 | -14,6381 | 21,4141 | 21,4141 |
| 427 | TH-50-62 | 10,7794 | -14,3121 | 14,3121 |
| 488 | TH-50-62 | 6,1026 | -10,8593 | 10,8593 |
| 517 | TH-50-62 | 17,9587 | -22,3495 | 22,3495 |
| 548 | TH-50-62 | 13,7366 | -15,8565 | 15,8565 |
| 579 | TH-50-62 | -9,1179 | 11,4803 | 11,4803 |
| 610 | TH-50-62 | -6,4658 | 8,9519 | 8,9519 |
| 365 | TH-50-78 | 9,9182 | -6,0643 | 9,9182 |
| 396 | TH-50-78 | 8,5013 | -4,5268 | 8,5013 |
| 427 | TH-50-78 | 6,7607 | -3,4999 | 6,7607 |
| 488 | TH-50-78 | 5,6653 | -3,4624 | 5,6653 |
| 517 | TH-50-78 | -15,7181 | 12,7544 | 15,7181 |
| 548 | TH-50-78 | -13,2332 | 9,5472 | 13,2332 |
| 579 | TH-50-78 | 11,0730 | -7,5943 | 11,0730 |
| 610 | TH-50-78 | 8,4746 | -4,7216 | 8,4746 |
| 365 | TH-50-86 | -1,2257 | 0,9424 | 1,2257 |
| 396 | TH-50-86 | 0,6992 | -0,7267 | 0,7267 |
| 427 | TH-50-86 | -0,6989 | 0,3823 | 0,6989 |
| 488 | TH-50-86 | -0,8184 | 0,2776 | 0,8184 |
| 517 | TH-50-86 | -1,4907 | 0,7266 | 1,4907 |
| 548 | TH-50-86 | 0,7957 | -0,5447 | 0,7957 |
| 579 | TH-50-86 | -0,8983 | 0,3819 | 0,8983 |
| 610 | TH-50-86 | -1,0493 | 0,2963 | 1,0493 |
| 365 | TH-57-16 | -11,4048 | 33,9044 | 33,9044 |
| 396 | TH-57-16 | -9,8054 | 24,0865 | 24,0865 |
| 427 | TH-57-16 | -7,4844 | 14,3333 | 14,3333 |
| 488 | TH-57-16 | 5,3567 | -8,5024 | 8,5024 |

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| 517 | TH-57-16 | 22,4509 | -16,8051 | 22,4509 |
| 548 | TH-57-16 | -14,0348 | 16,4581 | 16,4581 |
| 579 | TH-57-16 | -10,4388 | 11,8183 | 11,8183 |
| 610 | TH-57-16 | 8,4756 | -7,2035 | 8,4756 |
| 365 | TH-57-17 | -9,6175 | 11,8029 | 11,8029 |
| 396 | TH-57-17 | -8,3871 | 10,4958 | 10,4958 |
| 427 | TH-57-17 | -6,7495 | 9,3163 | 9,3163 |
| 488 | TH-57-17 | 8,8241 | -8,2075 | 8,8241 |
| 517 | TH-57-17 | 14,1927 | -12,4467 | 14,1927 |
| 548 | TH-57-17 | 12,8589 | -9,9278 | 12,8589 |
| 579 | TH-57-17 | 11,3917 | -8,1224 | 11,3917 |
| 610 | TH-57-17 | 9,7497 | -7,9729 | 9,7497 |
| 365 | TH-57-30 | -6,2148 | 12,9740 | 12,9740 |
| 396 | TH-57-30 | -5,1635 | 9,9075 | 9,9075 |
| 427 | TH-57-30 | -4,0196 | 6,8389 | 6,8389 |
| 488 | TH-57-30 | 3,0007 | -5,6202 | 5,6202 |
| 517 | TH-57-30 | -10,5370 | 11,0615 | 11,0615 |
| 548 | TH-57-30 | -8,9628 | 8,0528 | 8,9628 |
| 579 | TH-57-30 | 6,4398 | -7,3778 | 7,3778 |
| 610 | TH-57-30 | 4,4603 | -6,4283 | 6,4283 |
| 365 | TH-57-31 | 7,2837 | -8,6320 | 8,6320 |
| 396 | TH-57-31 | 5,5612 | -6,1989 | 6,1989 |
| 427 | TH-57-31 | -4,1186 | 3,9110 | 4,1186 |
| 488 | TH-57-31 | 2,0633 | -2,6489 | 2,6489 |
| 517 | TH-57-31 | -8,6064 | 10,9104 | 10,9104 |
| 548 | TH-57-31 | -7,2444 | 8,0484 | 8,0484 |
| 579 | TH-57-31 | -5,8679 | 5,2118 | 5,8679 |
| 610 | TH-57-31 | -4,0526 | 2,6615 | 4,0526 |
| 365 | TH-57-38 | -6,8387 | 7,4176 | 7,4176 |
| 396 | TH-57-38 | -6,1596 | 5,4713 | 6,1596 |
| 427 | TH-57-38 | -5,1970 | 4,3089 | 5,1970 |
| 488 | TH-57-38 | -3,9916 | 3,7054 | 3,9916 |
| 517 | TH-57-38 | 10,3431 | -9,4945 | 10,3431 |
| 548 | TH-57-38 | -8,8580 | 7,0638 | 8,8580 |
| 579 | TH-57-38 | -7,1039 | 5,4103 | 7,1039 |
| 610 | TH-57-38 | -5,3550 | 3,9508 | 5,3550 |
| 365 | TH-57-45 | -0,1645 | 0,3850 | 0,3850 |
| 396 | TH-57-45 | -0,1069 | 0,2702 | 0,2702 |
| 427 | TH-57-45 | 0,0709 | -0,1708 | 0,1708 |
| 488 | TH-57-45 | 0,0505 | -0,1792 | 0,1792 |
| 517 | TH-57-45 | -0,2156 | 0,2979 | 0,2979 |
| 548 | TH-57-45 | -0,1350 | 0,2216 | 0,2216 |

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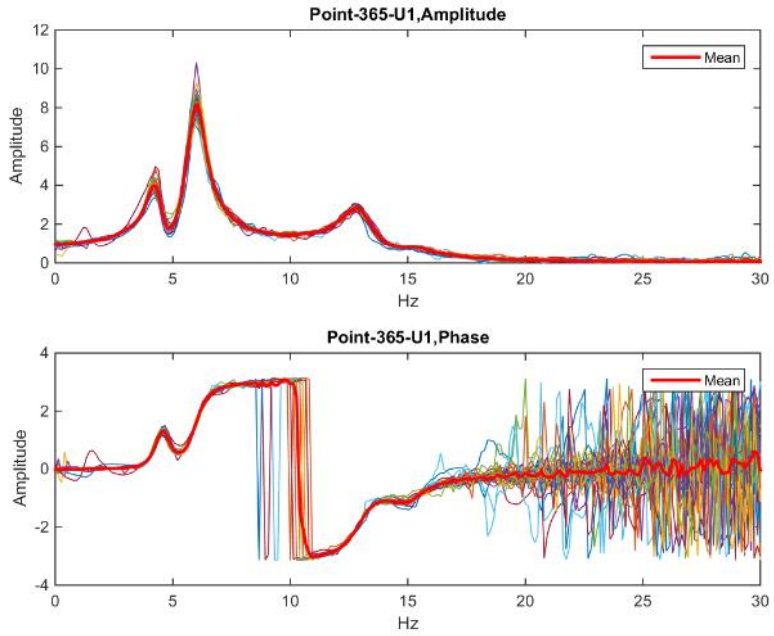
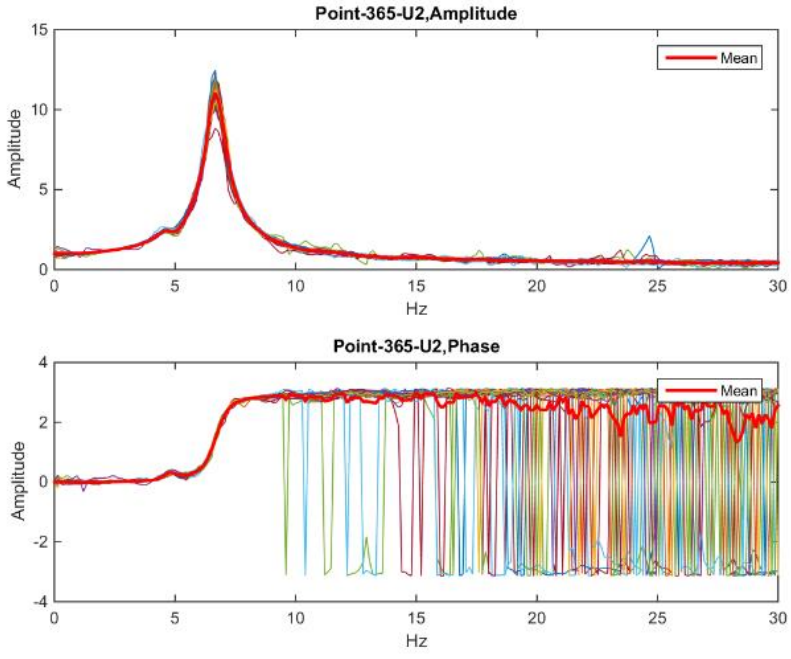
| 579 | TH-57-45 | -0,1226 | 0,1458 | 0,1458 |
| 610 | TH-57-45 | -0,1341 | 0,1154 | 0,1341 |
| 365 | TH-57-51 | 11,0134 | -10,9511 | 11,0134 |
| 396 | TH-57-51 | 10,0378 | -9,8085 | 10,0378 |
| 427 | TH-57-51 | 8,6794 | -8,6613 | 8,6794 |
| 488 | TH-57-51 | 7,1521 | -7,4214 | 7,4214 |
| 517 | TH-57-51 | -11,5248 | 24,2117 | 24,2117 |
| 548 | TH-57-51 | -10,2268 | 18,9599 | 18,9599 |
| 579 | TH-57-51 | -8,4808 | 13,6702 | 13,6702 |
| 610 | TH-57-51 | -6,3220 | 8,8876 | 8,8876 |
| 365 | TH-57-69 | -20,1818 | 17,4891 | 20,1818 |
| 396 | TH-57-69 | -13,8523 | 12,6437 | 13,8523 |
| 427 | TH-57-69 | 9,5715 | -8,9495 | 9,5715 |
| 488 | TH-57-69 | -4,5990 | 6,1814 | 6,1814 |
| 517 | TH-57-69 | 18,2349 | -13,7618 | 18,2349 |
| 548 | TH-57-69 | 15,3051 | -11,0979 | 15,3051 |
| 579 | TH-57-69 | -14,1385 | 8,0755 | 14,1385 |
| 610 | TH-57-69 | -10,5911 | 6,9937 | 10,5911 |
| 365 | TH-57-87 | -1,5044 | 1,9569 | 1,9569 |
| 396 | TH-57-87 | -1,0760 | 1,4325 | 1,4325 |
| 427 | TH-57-87 | -0,6938 | 0,9167 | 0,9167 |
| 488 | TH-57-87 | 0,8046 | -0,4957 | 0,8046 |
| 517 | TH-57-87 | -1,2201 | 0,9903 | 1,2201 |
| 548 | TH-57-87 | -0,8293 | 0,7793 | 0,8293 |
| 579 | TH-57-87 | -0,9702 | 0,5986 | 0,9702 |
| 610 | TH-57-87 | -0,8983 | 0,4219 | 0,8983 |
| 365 | TH-57-9 | 14,6900 | -18,2936 | 18,2936 |
| 396 | TH-57-9 | 12,8281 | -15,5138 | 15,5138 |
| 427 | TH-57-9 | -12,7548 | 10,8430 | 12,7548 |
| 488 | TH-57-9 | 8,9918 | -11,4066 | 11,4066 |
| 517 | TH-57-9 | 25,1099 | -29,0068 | 29,0068 |
| 548 | TH-57-9 | 21,5819 | -22,8882 | 22,8882 |
| 579 | TH-57-9 | -17,8540 | 17,0660 | 17,8540 |
| 610 | TH-57-9 | -14,2634 | 11,8040 | 14,2634 |

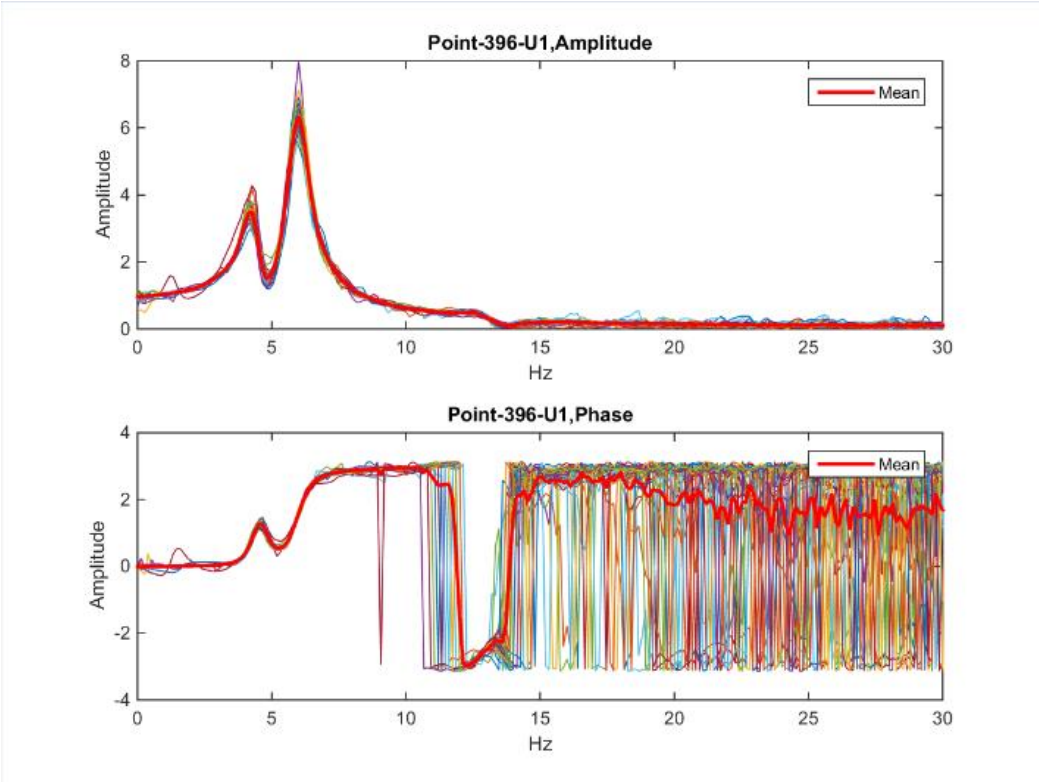
# 2. TRANSFER FUNCTION RESSULTS



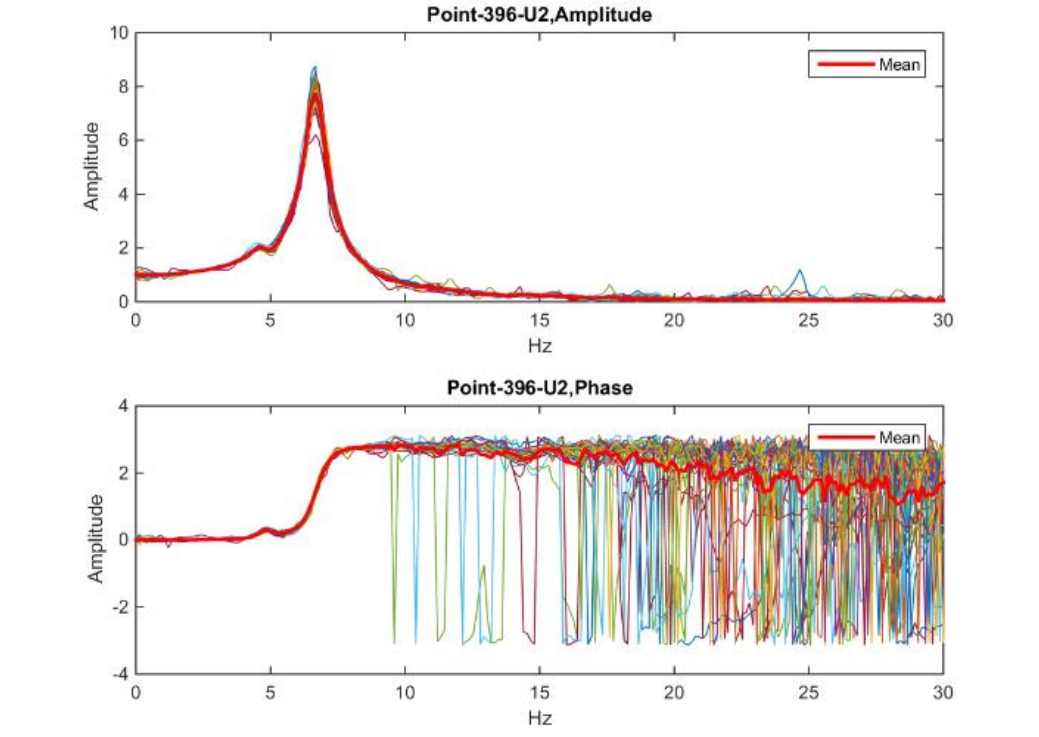

Picture 1. Transfer function of the node 365 direction $U_1$



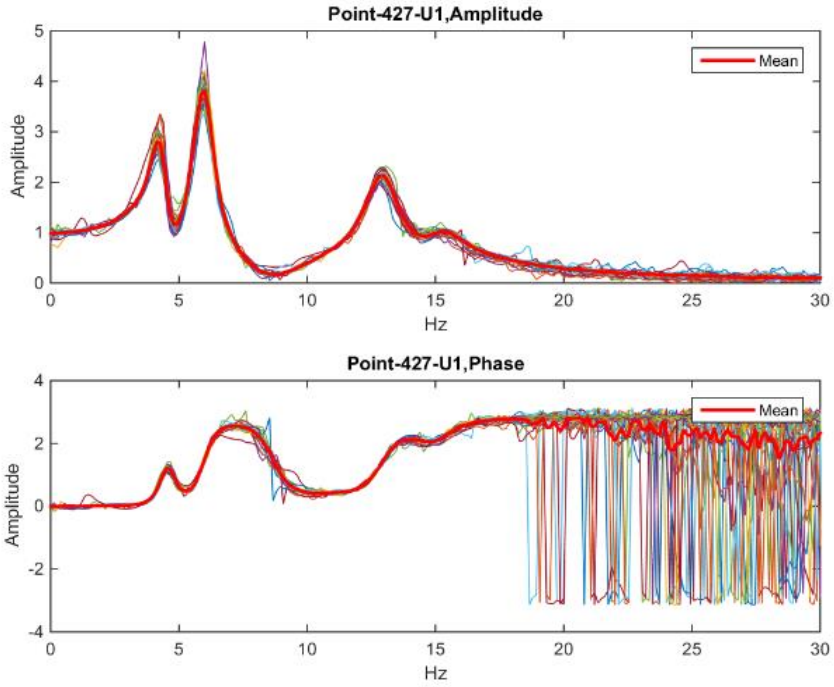

PIcture 2. Transfer function of the node 365 direction $U_2$



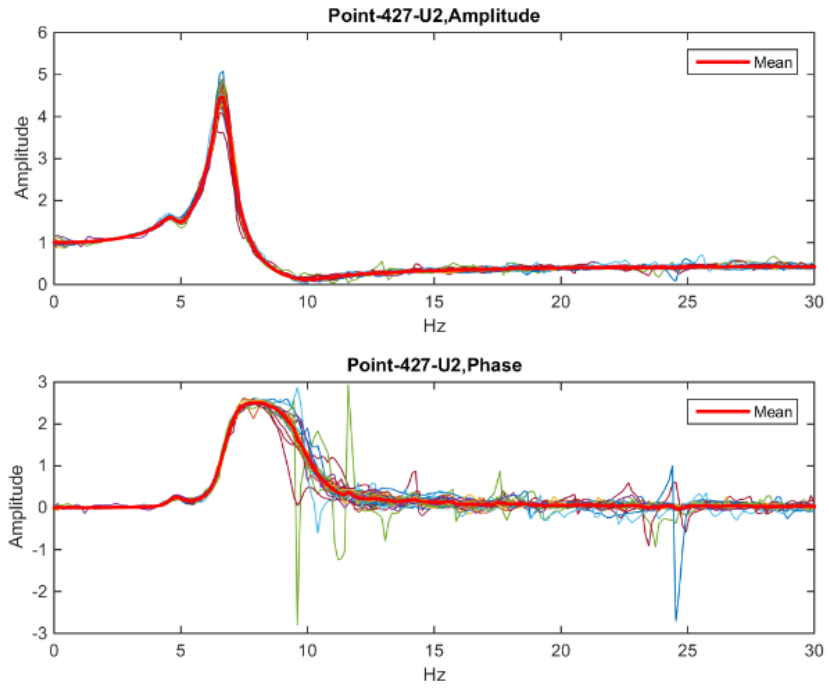

Picture 3. Transfer function of the node 396 direction $U_1$



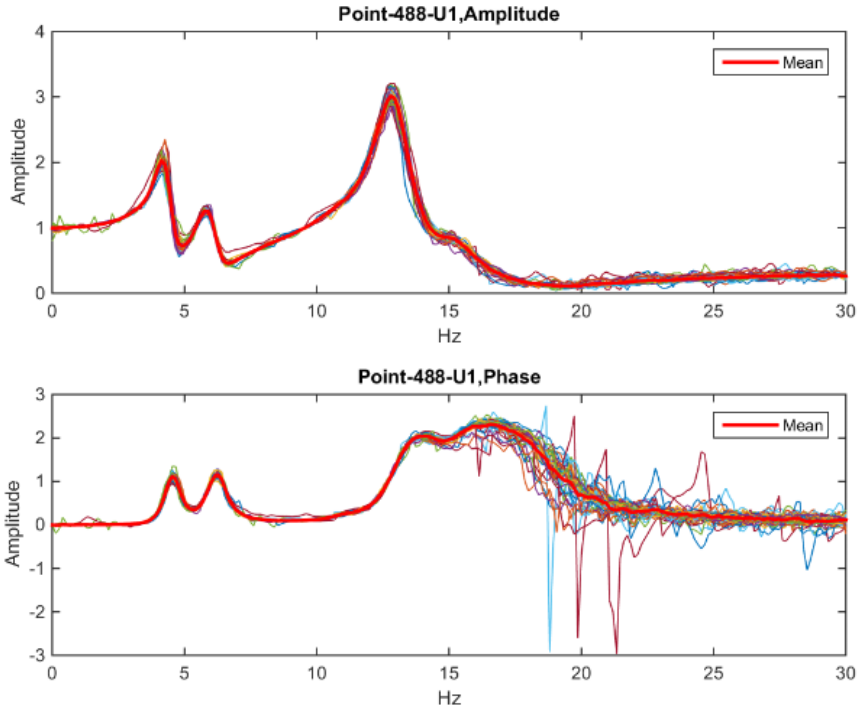

Picture 4. Transfer function of the node 396 direction $U_2$



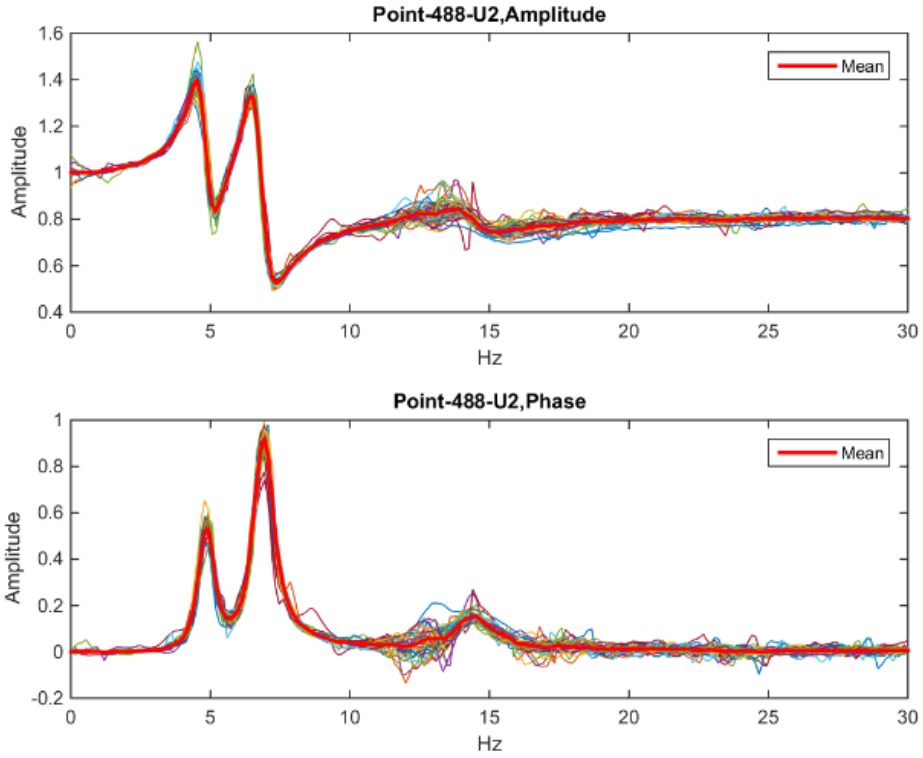

Picture 5. Transfer function of the node 427 direction $U_1$



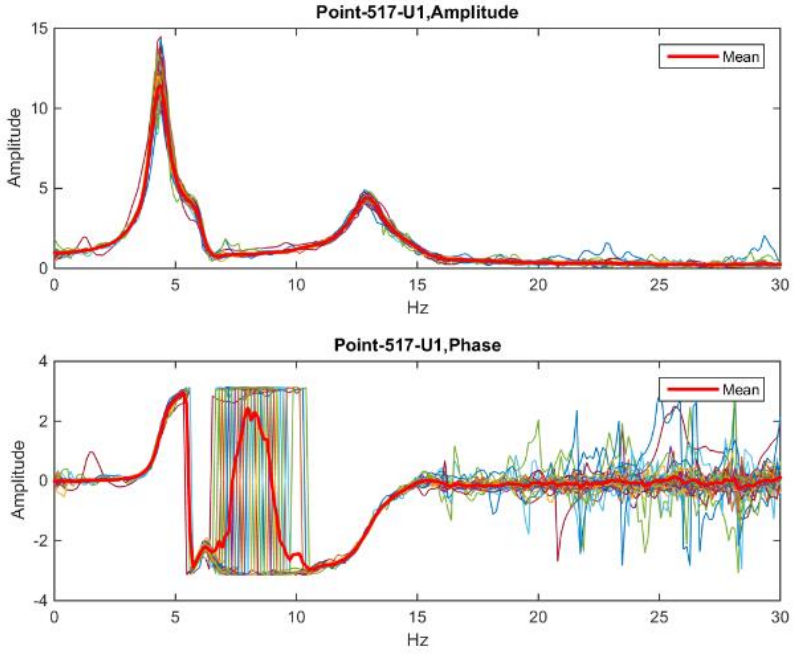

Picture 6. Transfer function of the node 427 direction $U_2$



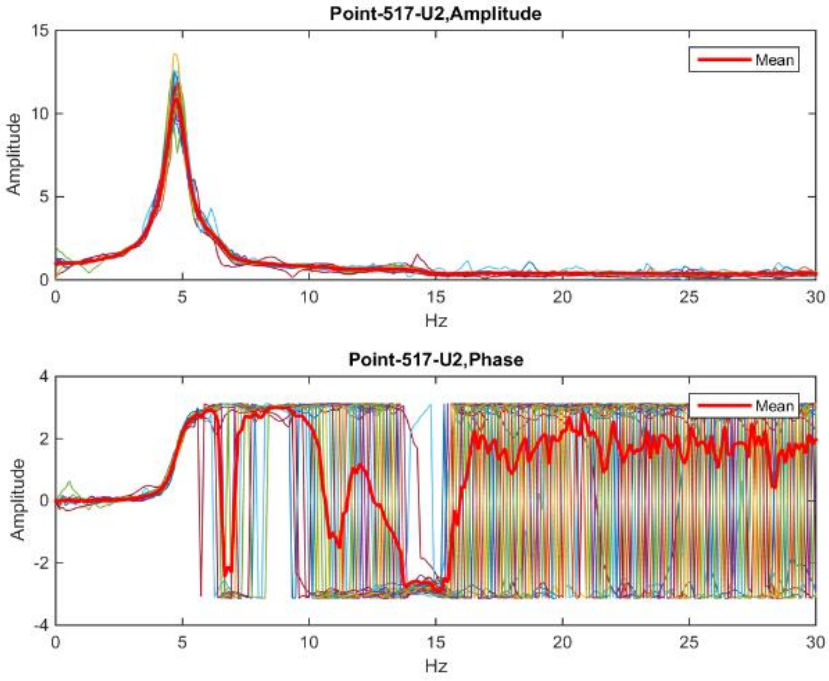

Picture 7. Transfer function of the node 488 direction $U_1$



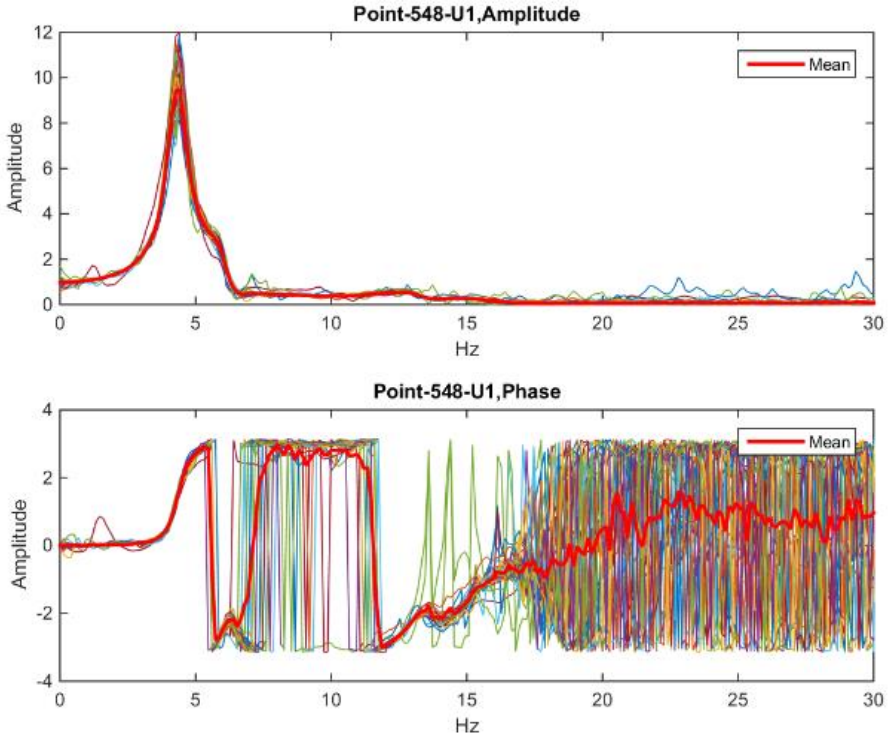

Picture 8. Transfer function of the node 488 direction $U_2$



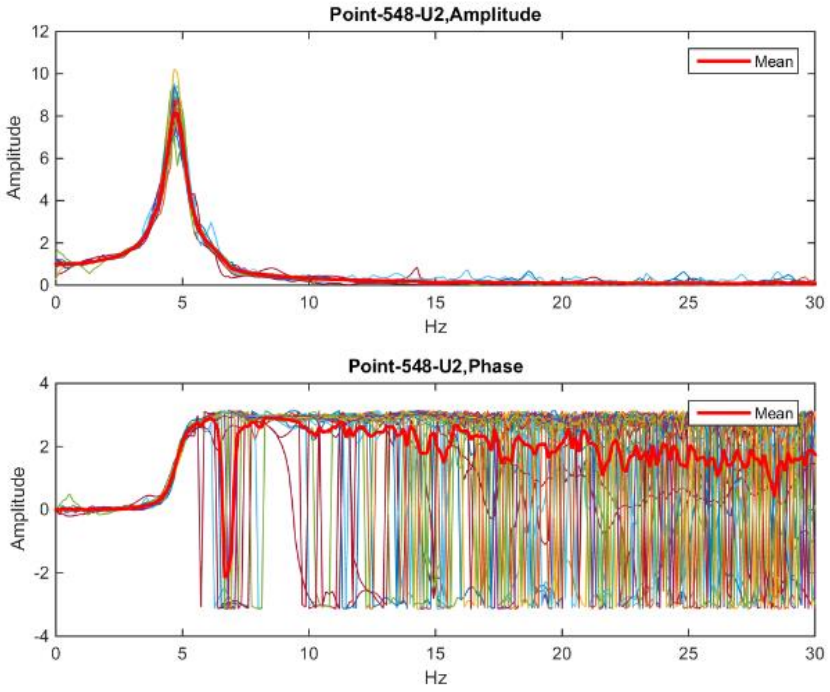

Picture 9. Transfer function of the node 517 direction $U_1$



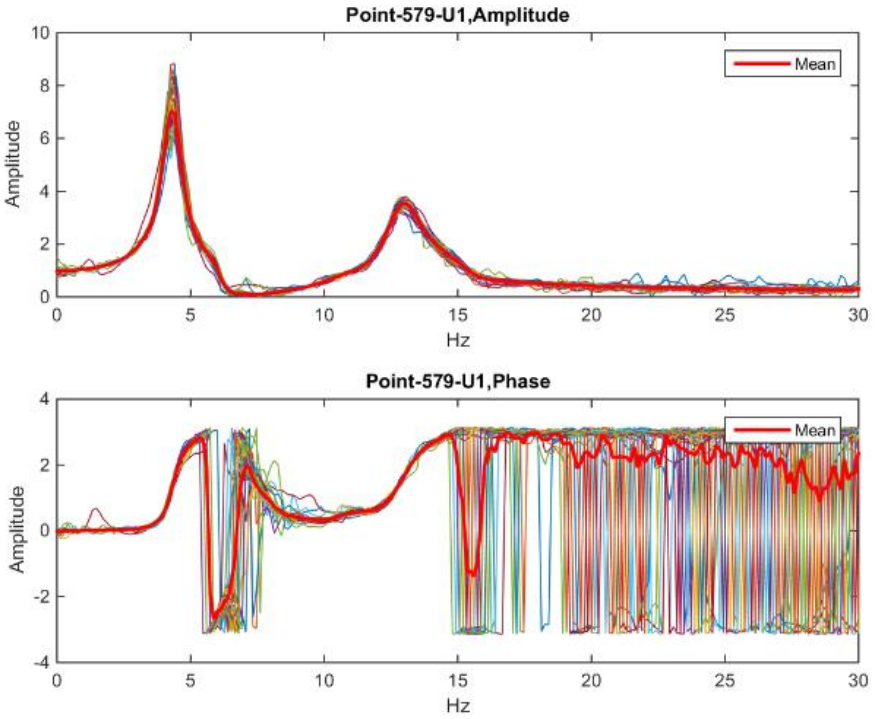

Picture 10. Transfer function of the node 517 direction $U_2$



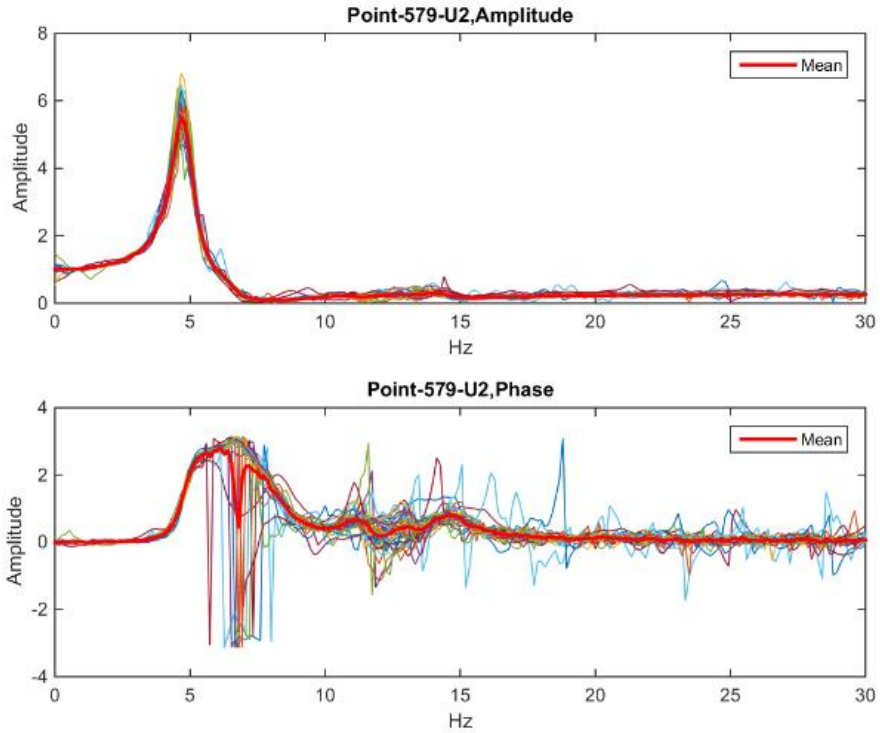

Picture 11. Transfer function of the node 548 direction $U_1$



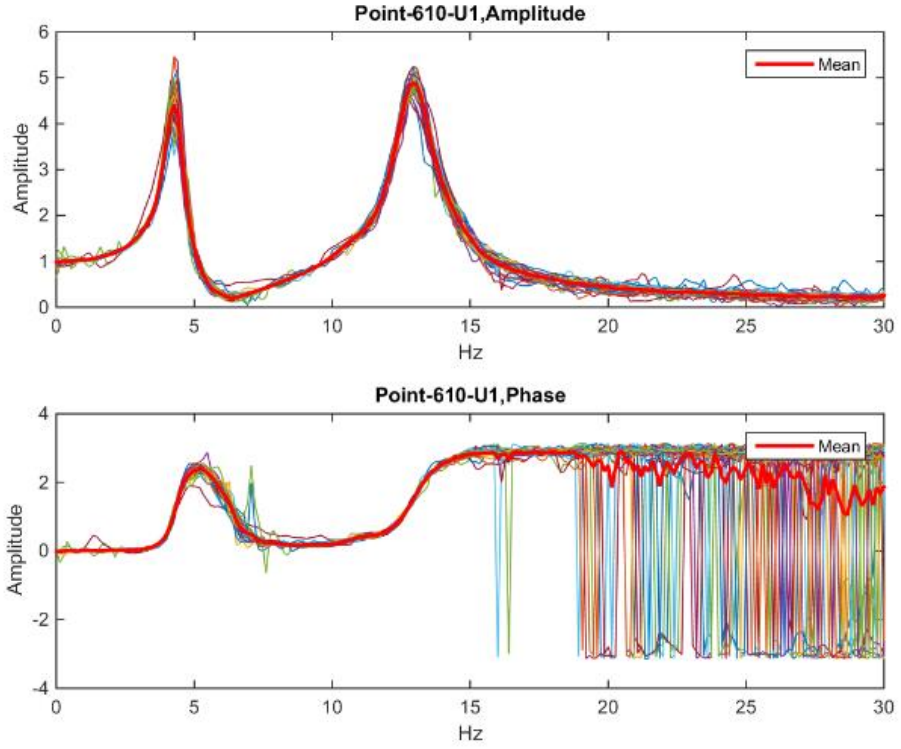

Picture 12.Transfer function of the node 548 direction U2



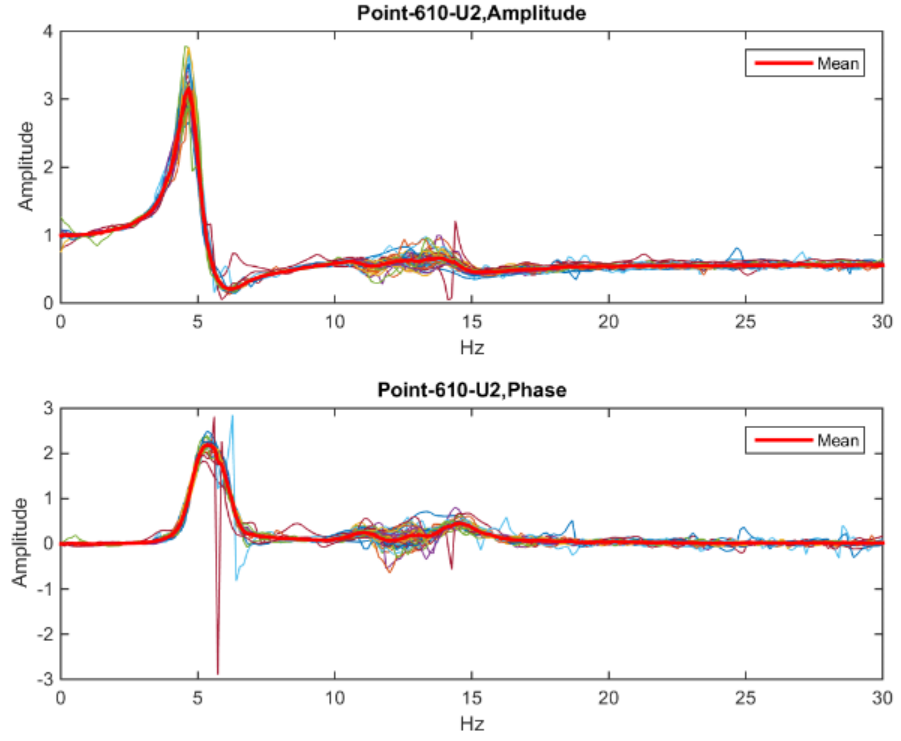

Picture 13. Transfer function of the node 579 direction $U_1$




Picture 14. Transfer function of the node 579 direction $U_2$



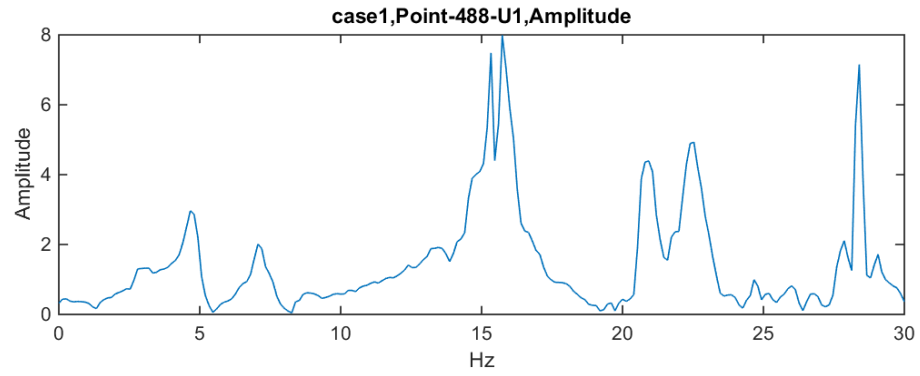

Picture 15. Transfer function of the node 610 direction $U_1$

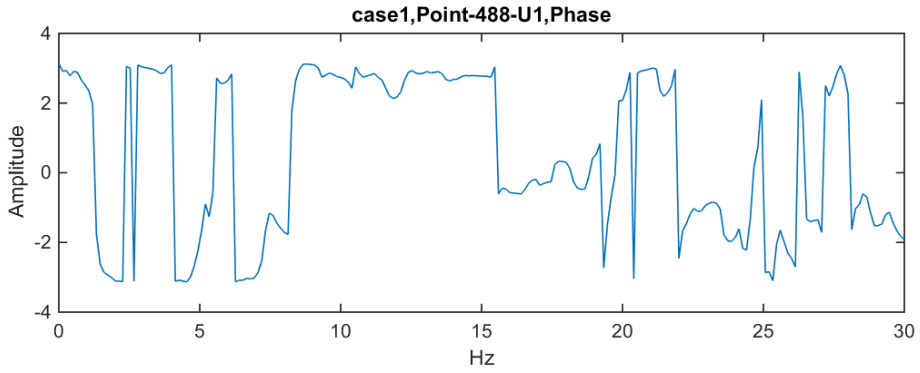


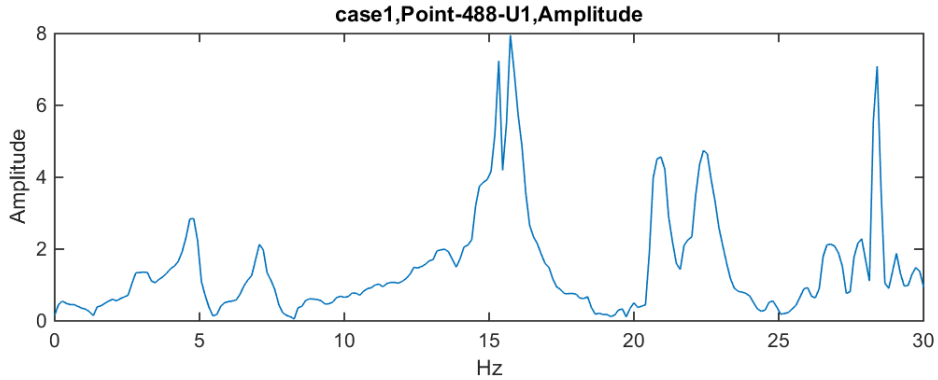

Picture 16. Transfer function of the node 610 direction $U_2$

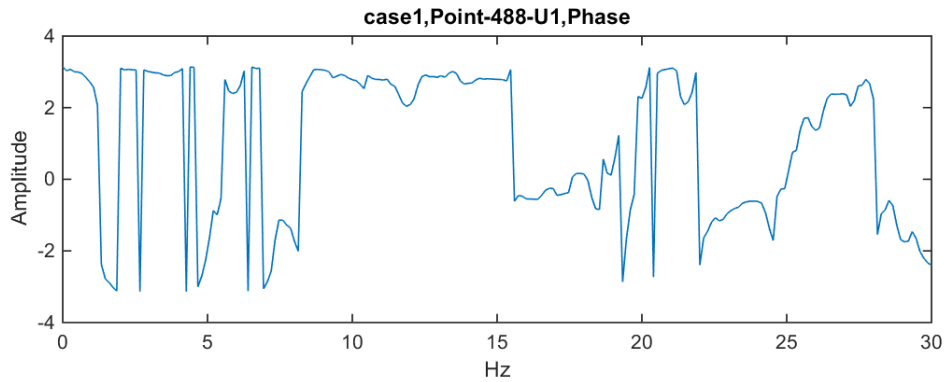
# 3. TRANSFER FUNCTION OF THE EXPERIMENTAL RESULTS

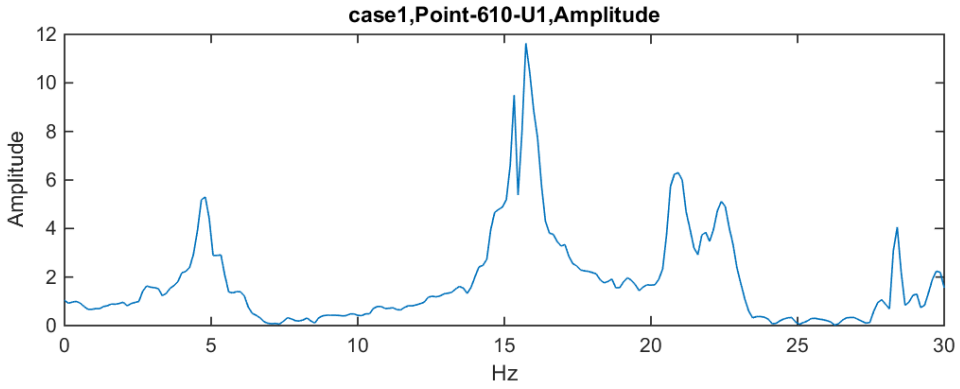
## 3.1. CASE 1




case1,Point-610-U1,Amplitude
Amplitude
Hz
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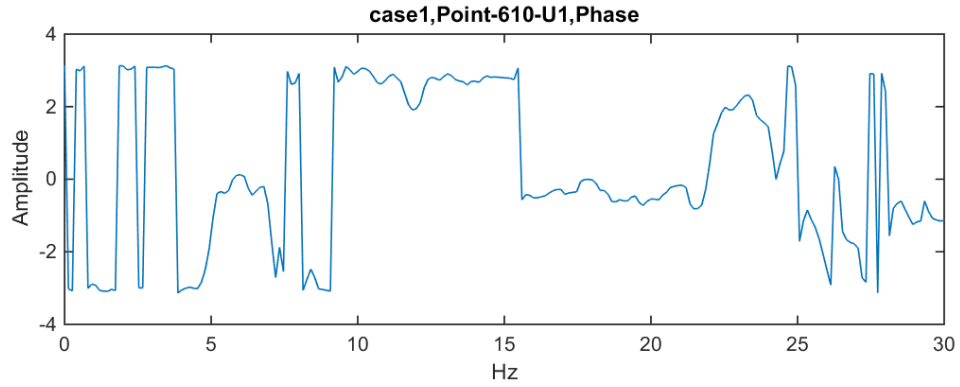
6
8
10
12
0
5
10
15
20
25
30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Amplitude
Hz
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-2
0
2
4
0
5
10
15
20
25
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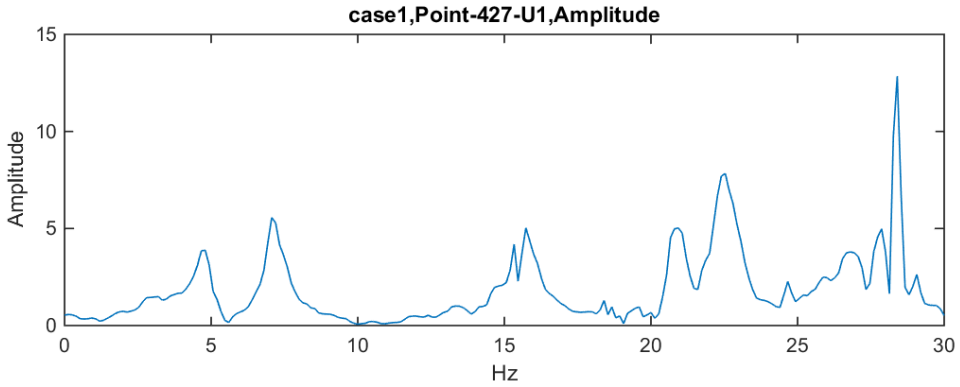
case1,Point-427-U1,Amplitude
Amplitude
Hz
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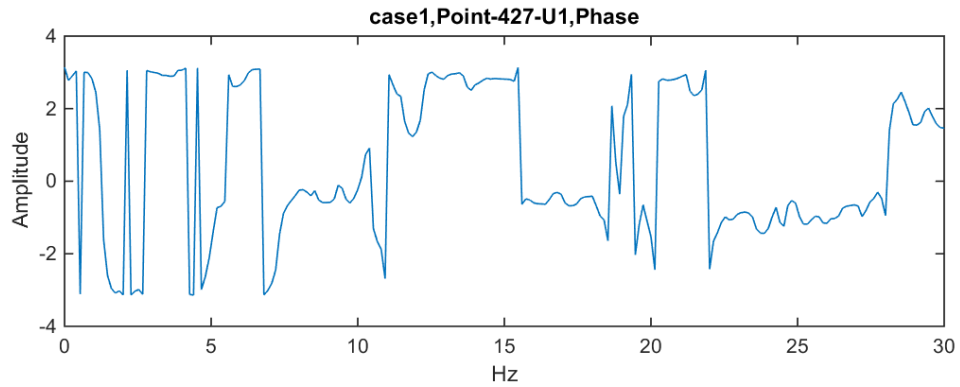
5
10
15
0
5
10
15
20
25
30


case1,Point-427-U1,Phase
Amplitude
Hz
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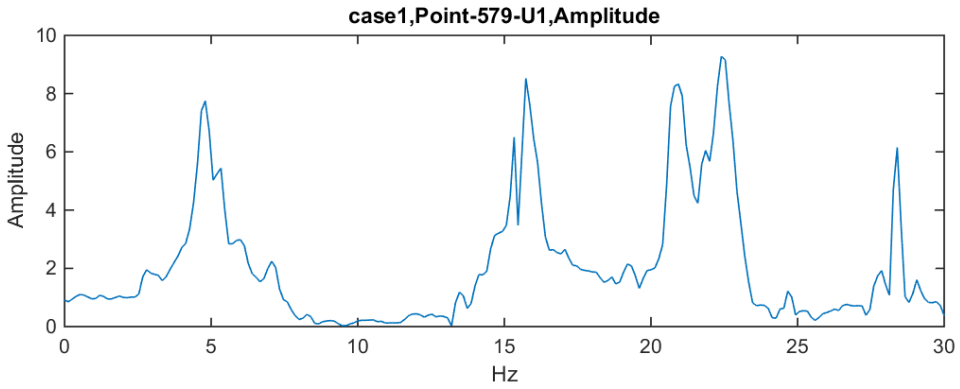
2
4
0
5
10
15
20
25
30


case1,Point-579-U1,Amplitude
Amplitude
Hz
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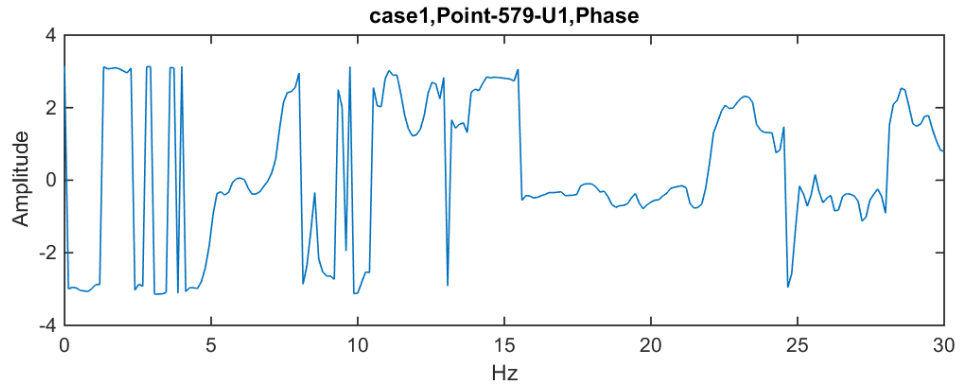
6
8
10
0
5
10
15
20
25
30


case1,Point-579-U1,Phase
Amplitude
Hz
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-2
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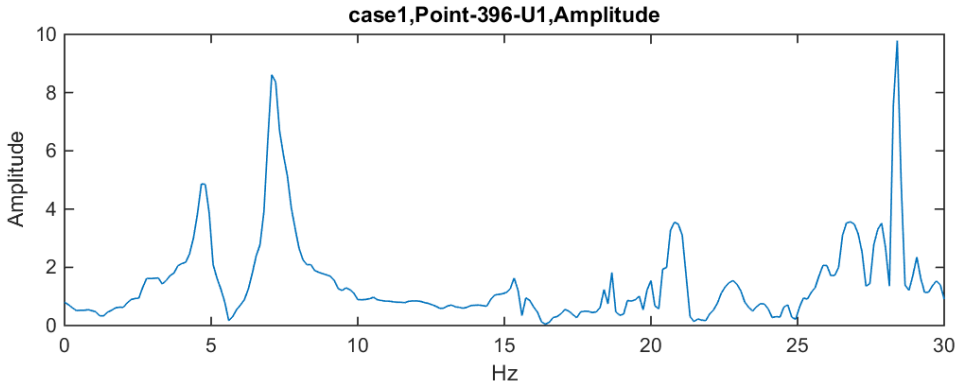
2
4
0
5
10
15
20
25
30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Hz
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5
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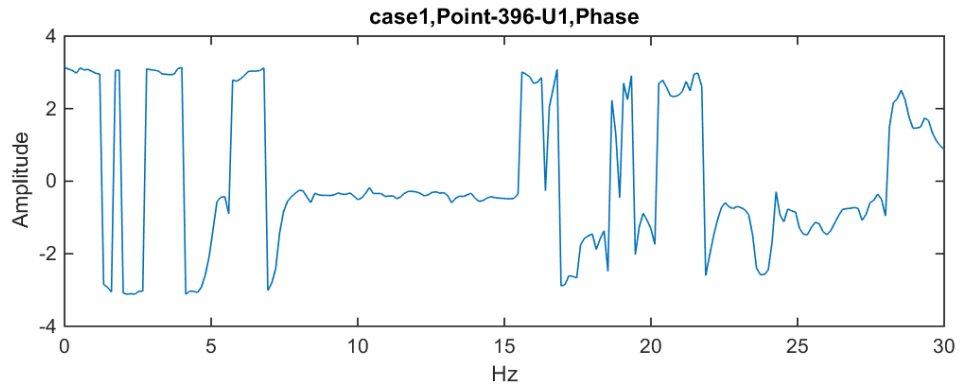
15
20
25
30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15
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25
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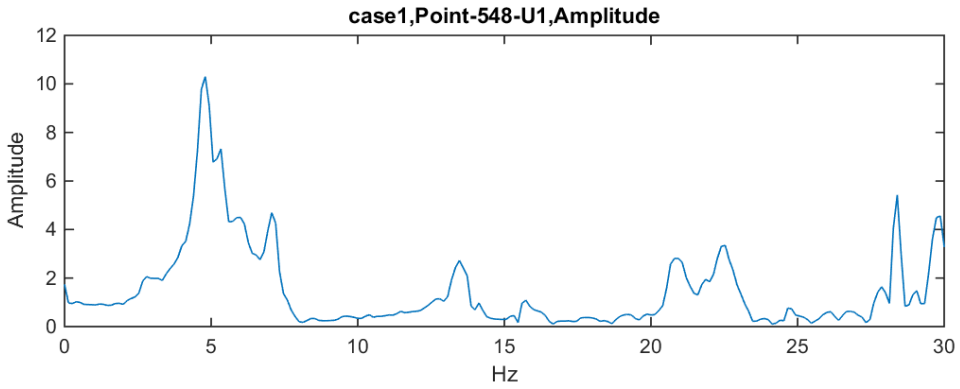
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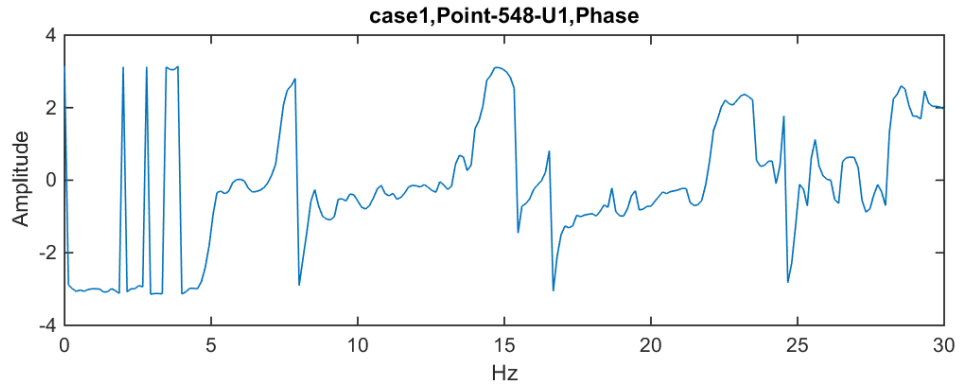
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25
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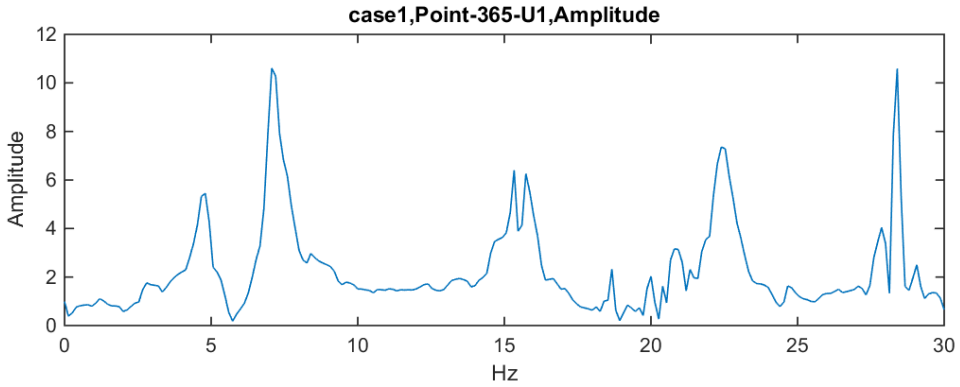
case1,Point-365-U1,Amplitude
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15
20
25
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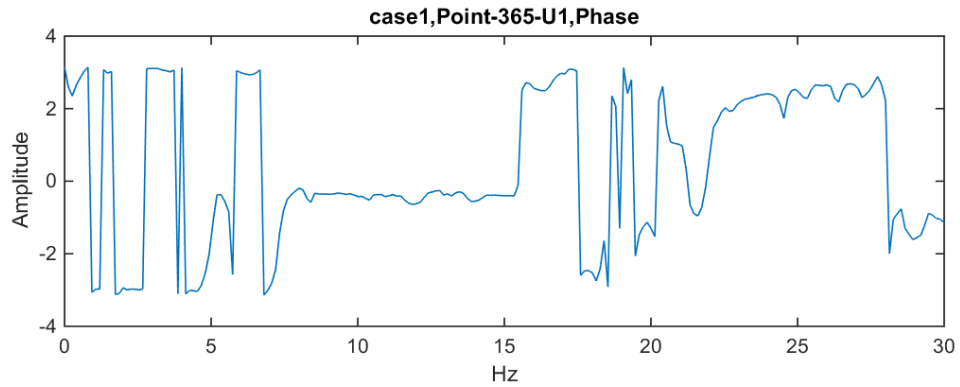
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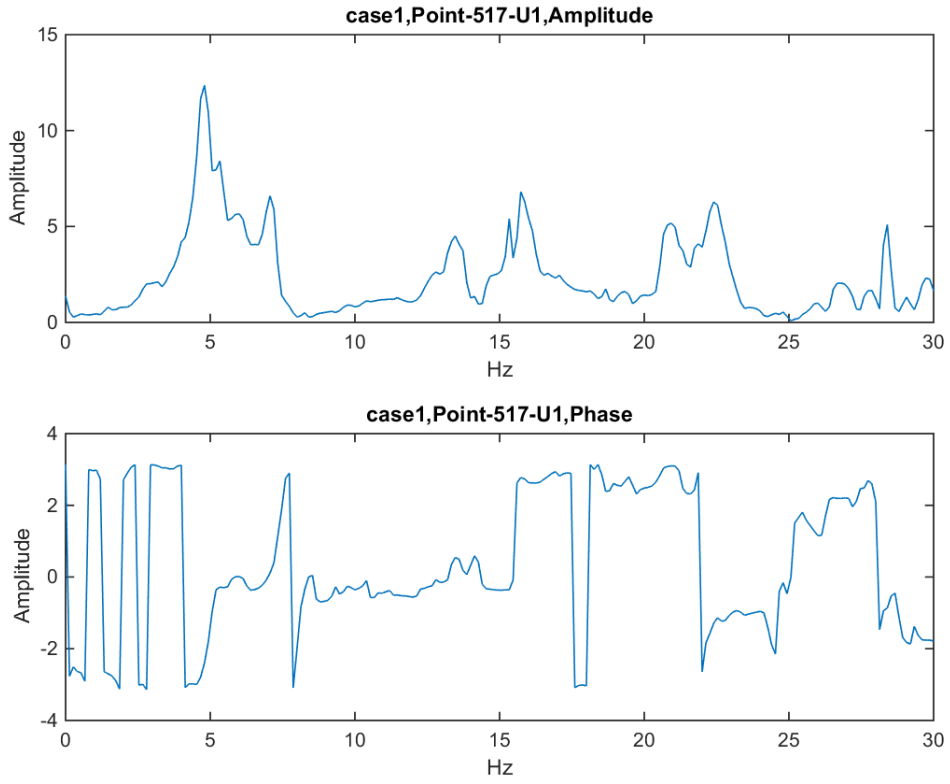
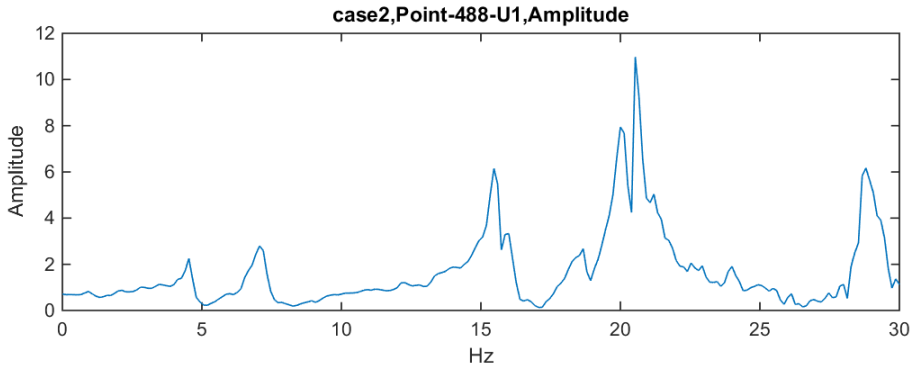
15
20
25
30


case1,Point-517-U1,Amplitude
Amplitude
Hz
case1,Point-517-U1,Phase
Amplitude
Hz

## 3.2. CASE 2


case2,Point-488-U1,Amplitude
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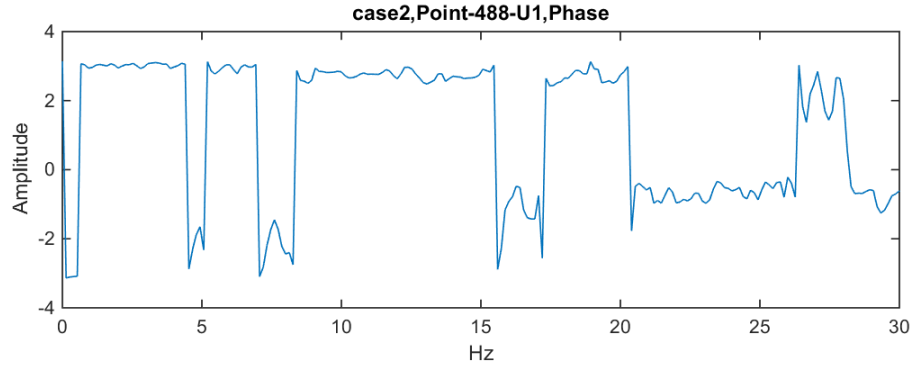
15
20
25
30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Hz
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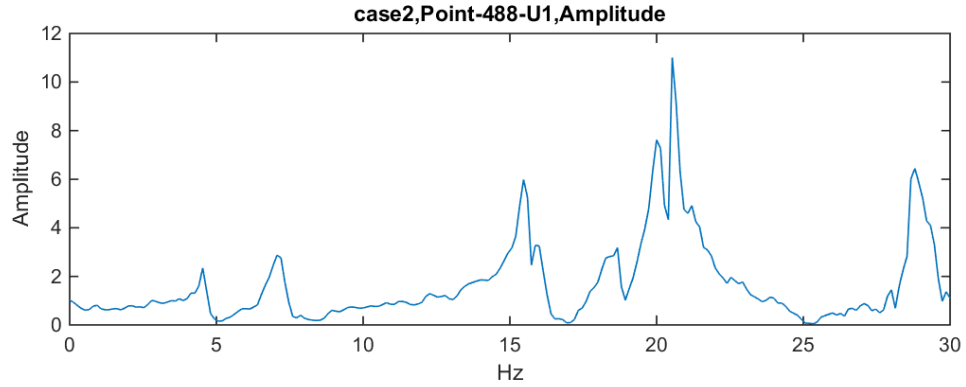
case2,Point-488-U1,Amplitude
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15
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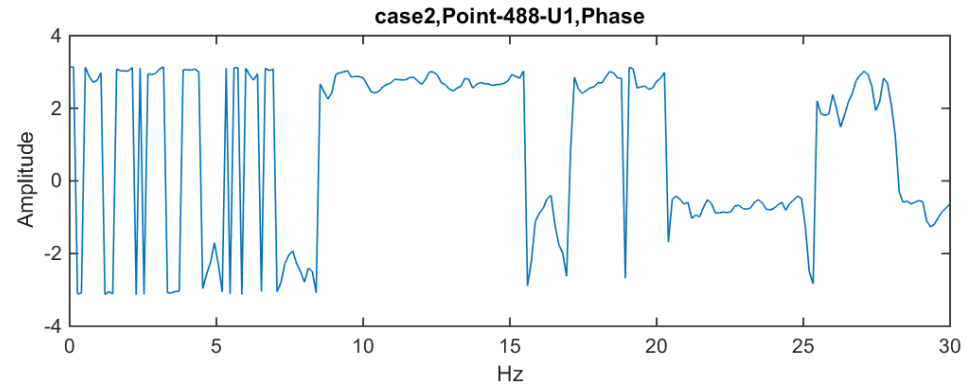
25
30


case2,Point-488-U1,Phase
Amplitude
Hz
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-2
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0
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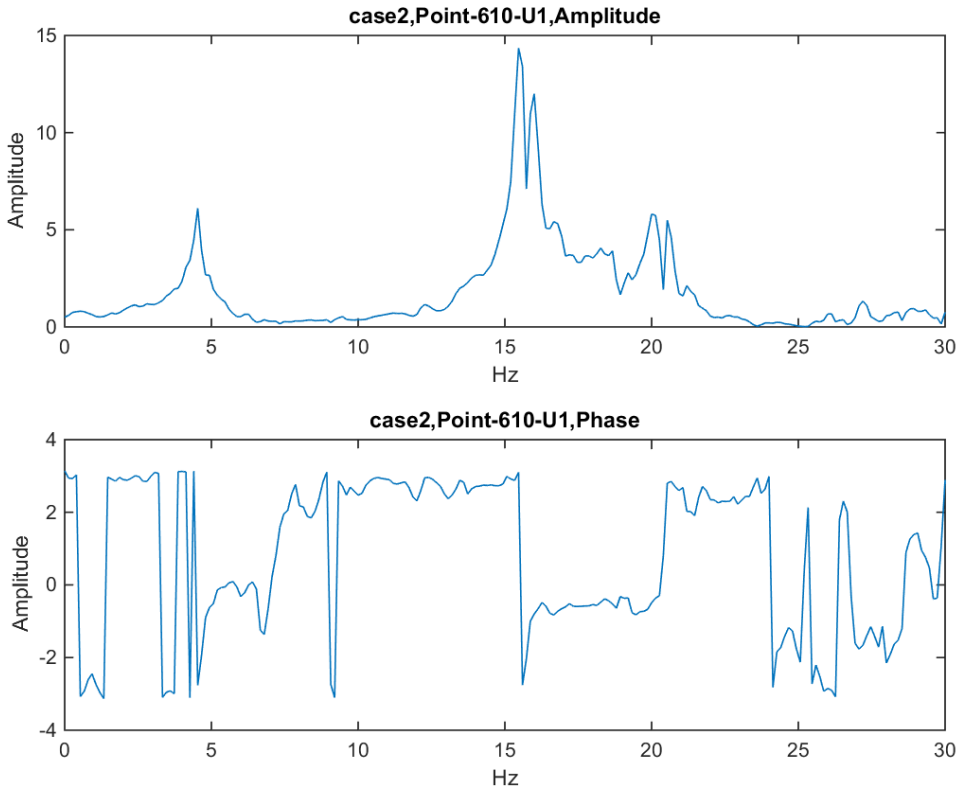
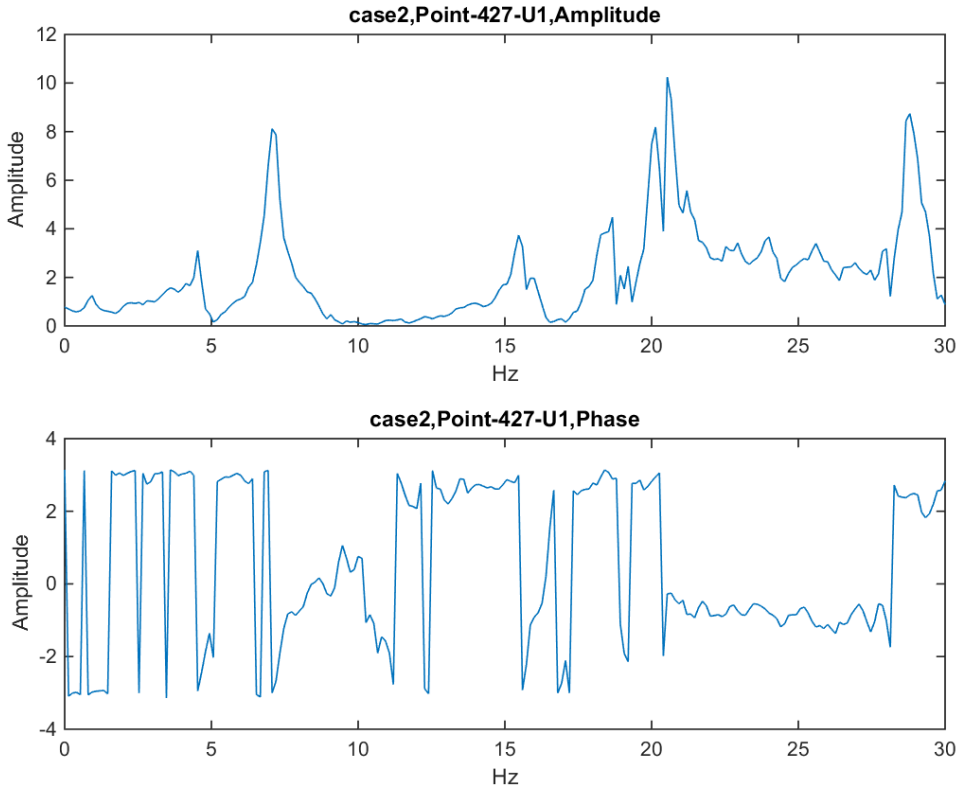
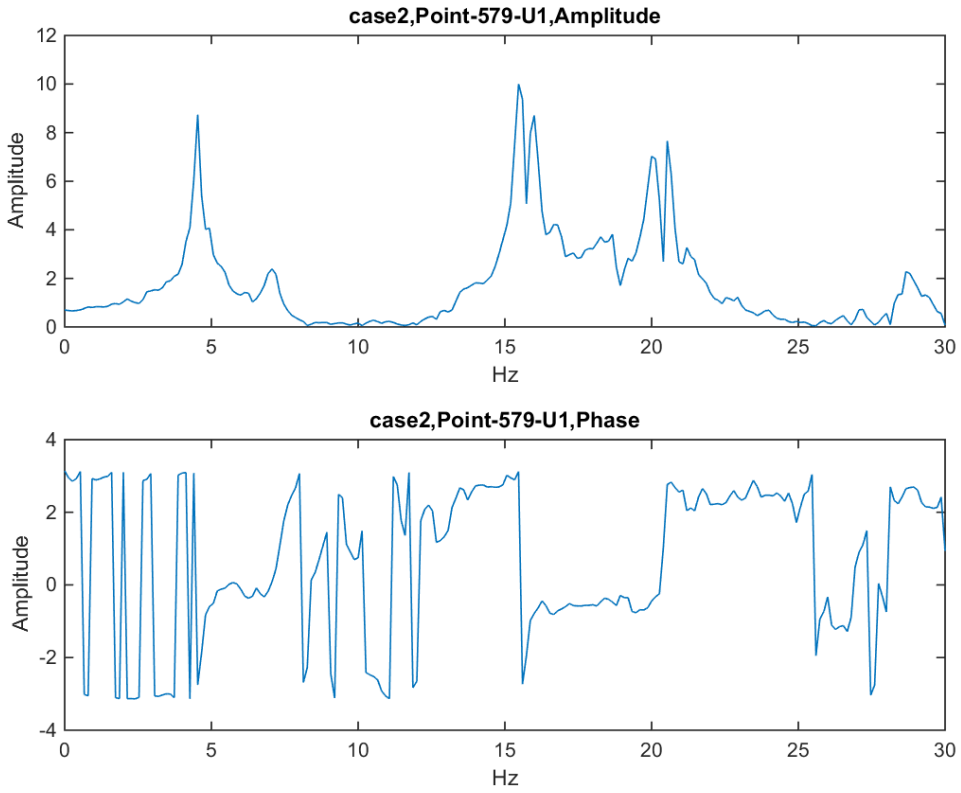
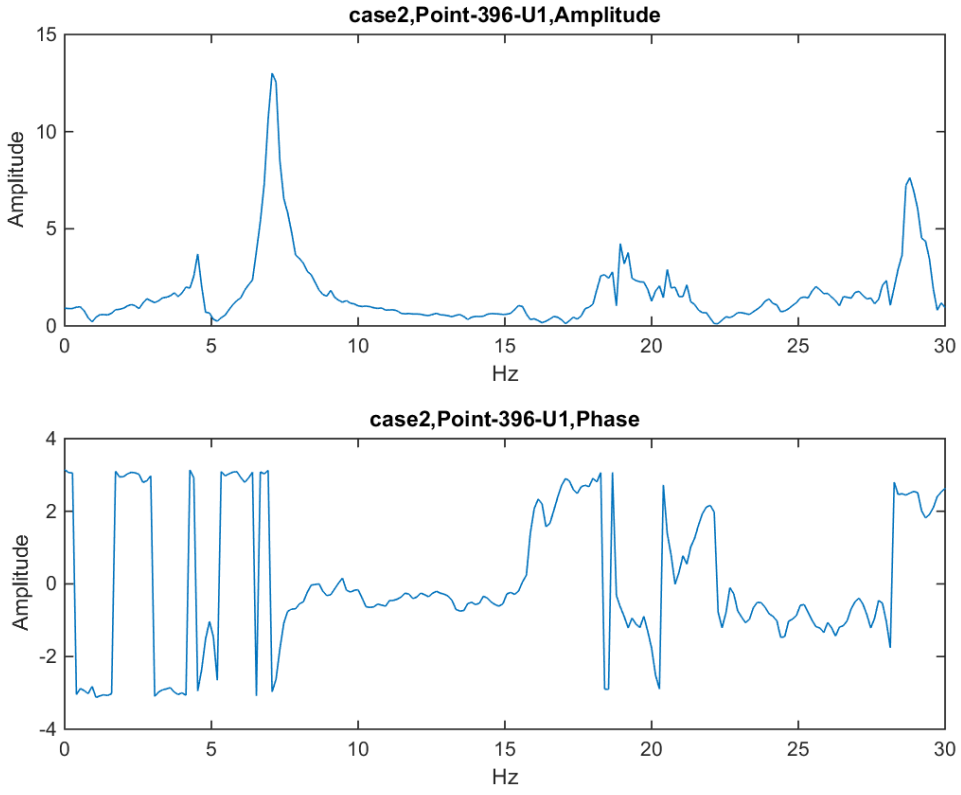
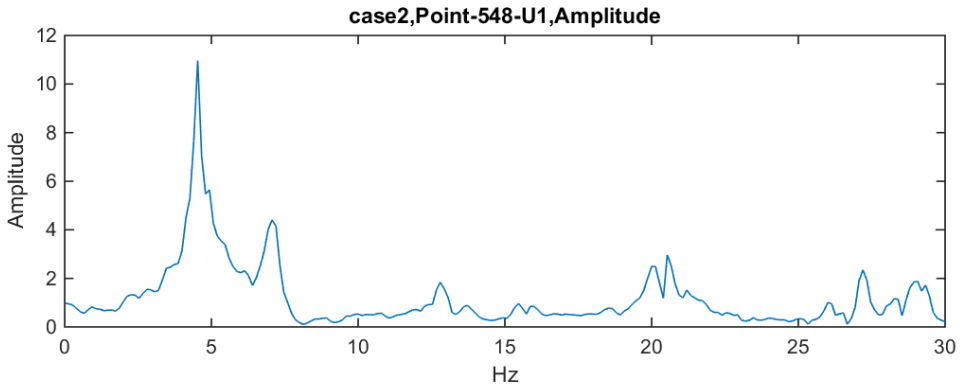
10
15
20
25
30

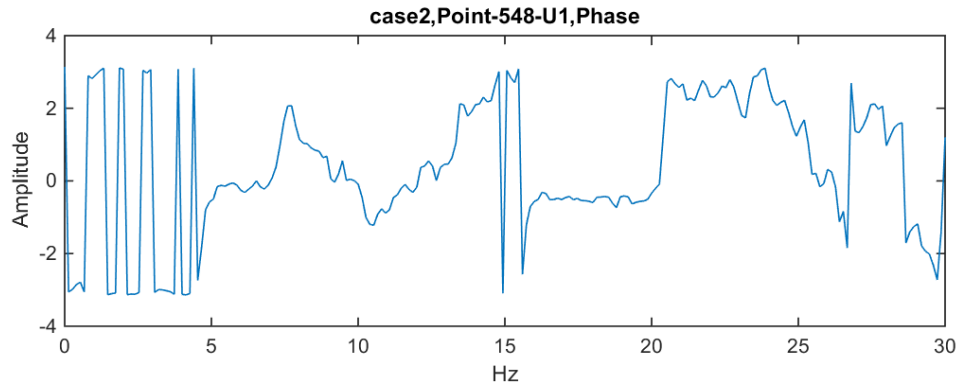

case2,Point-610-U1,Amplitude
Amplitude
Hz
case2,Point-610-U1,Phase
Amplitude
Hz

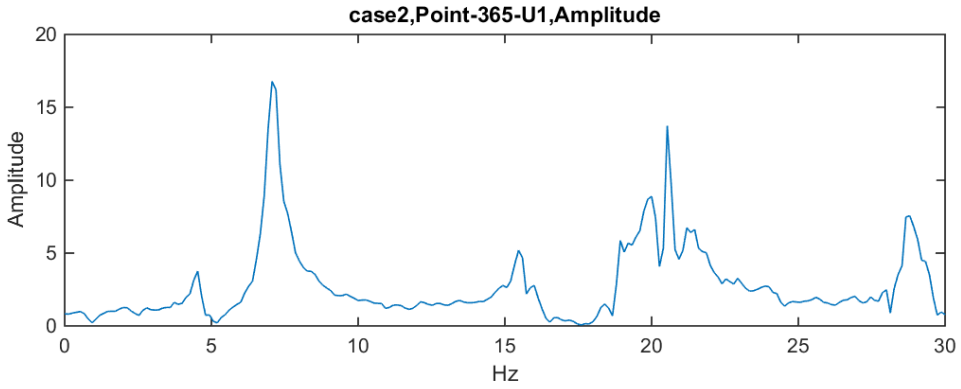

case2,Point-427-U1,Amplitude
Amplitude
Hz
case2,Point-427-U1,Phase
Amplitude
Hz

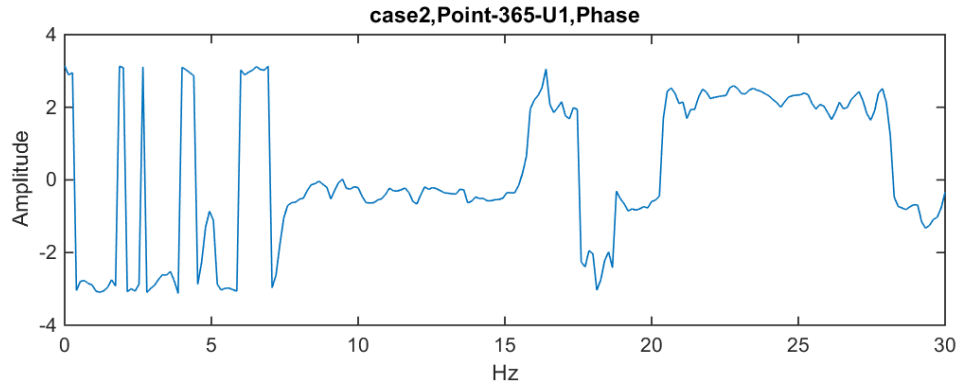

case2,Point-579-U1,Amplitude
Amplitude
Hz
case2,Point-579-U1,Phase
Amplitude
Hz

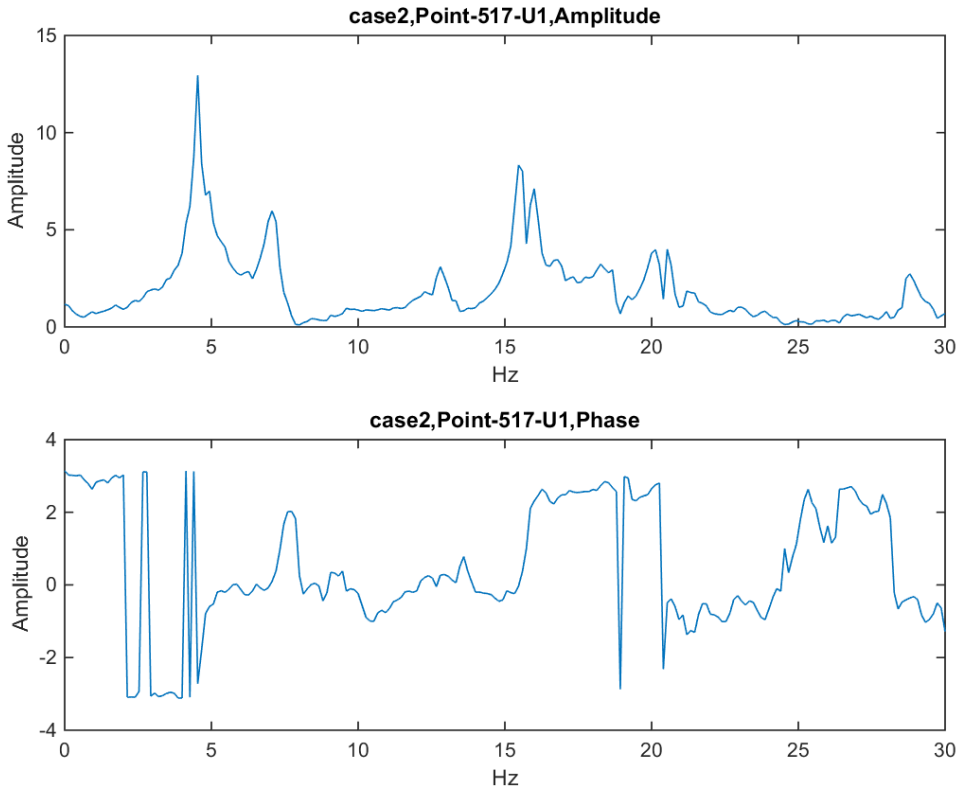

case2,Point-396-U1,Amplitude
Amplitude
Hz
case2,Point-396-U1,Phase
Amplitude
Hz


case2,Point-548-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

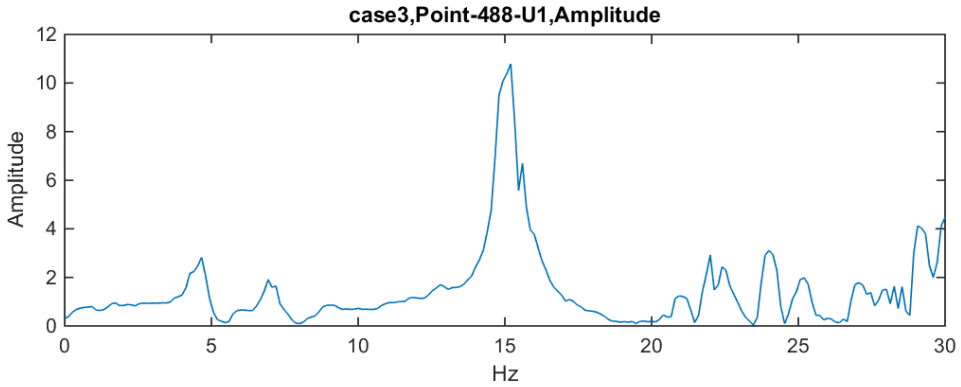

case2,Point-548-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

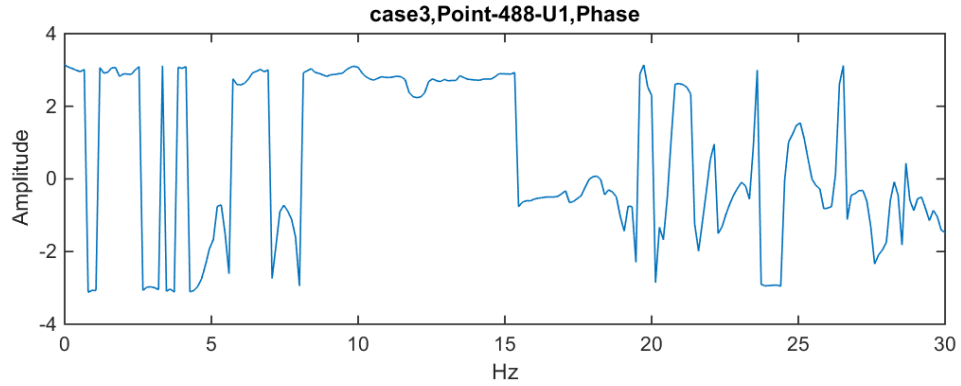

case2,Point-365-U1,Amplitude
Amplitude
Hz
0
5
10
15
20
0
5
10
15
20
25
30

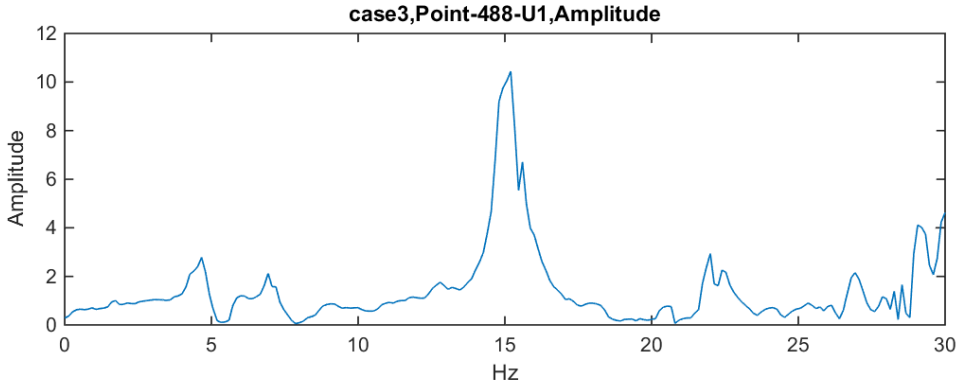

case2,Point-365-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

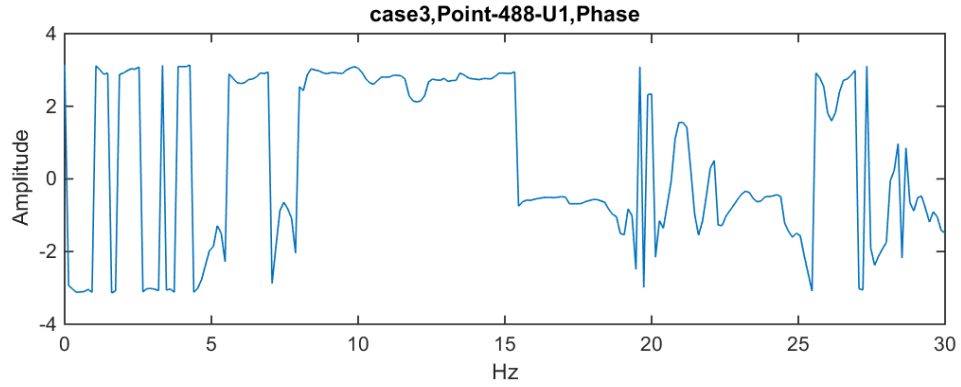

case2,Point-517-U1,Amplitude
Amplitude
Hz
case2,Point-517-U1,Phase
Amplitude
Hz

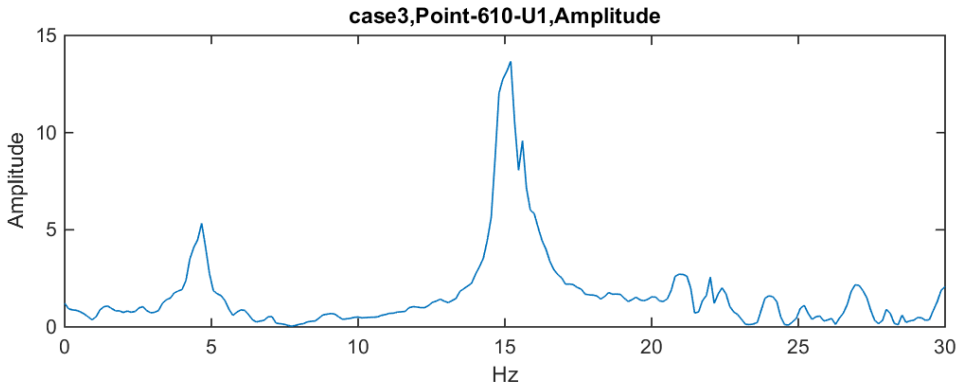
## 3.3. CASE 3

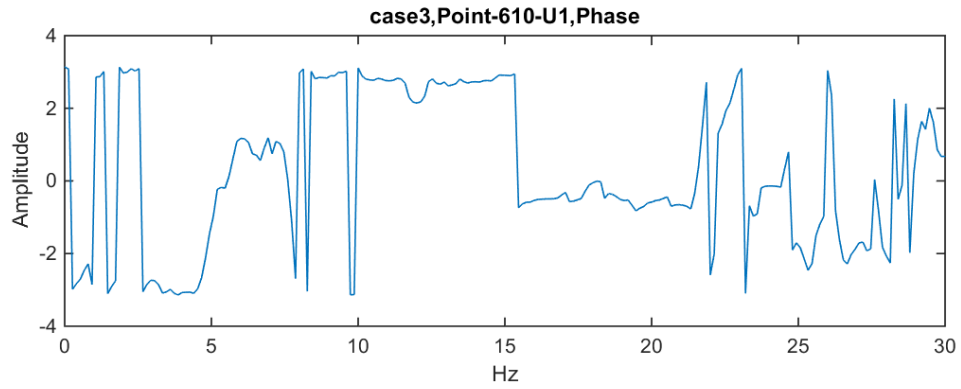

case3,Point-488-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

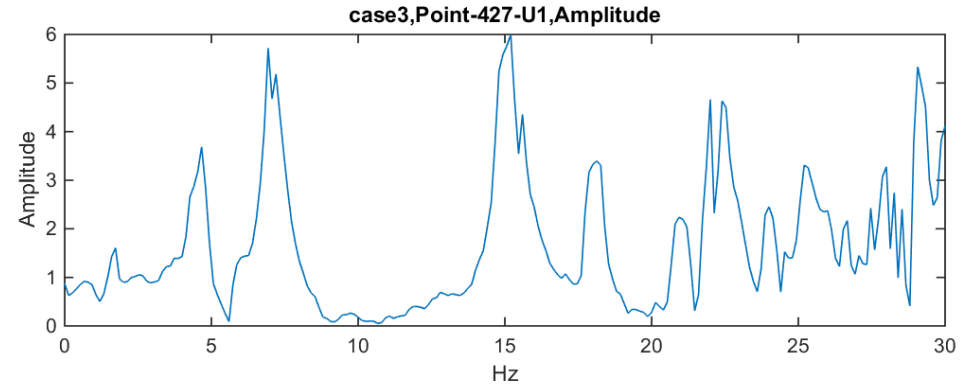

case3,Point-488-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

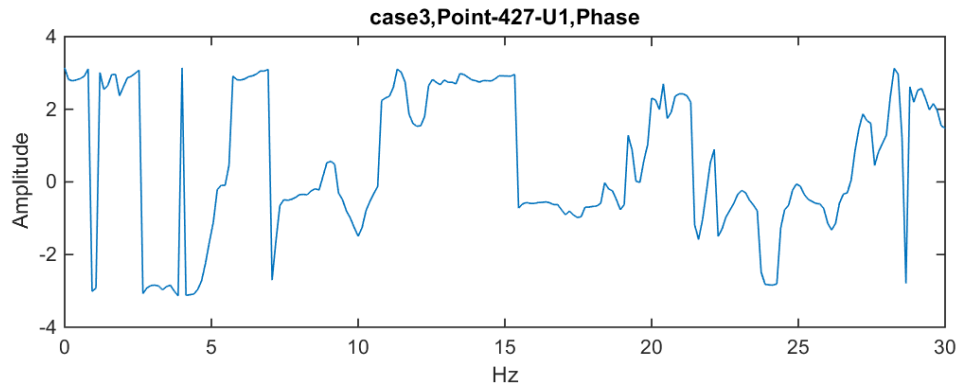

case3,Point-488-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

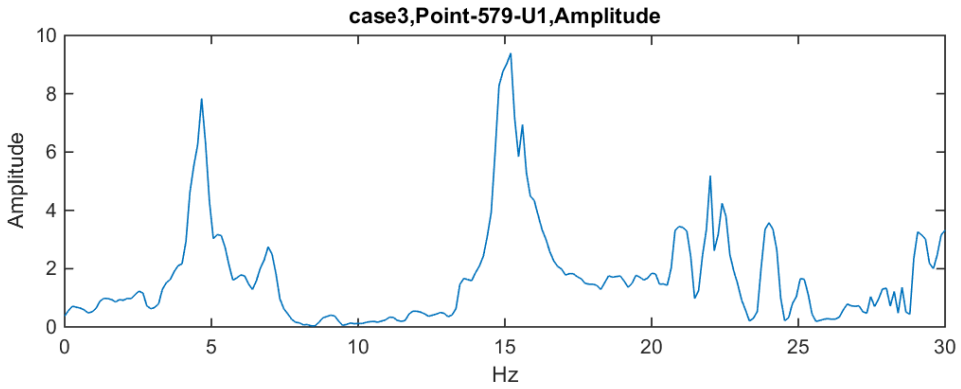

case3,Point-488-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

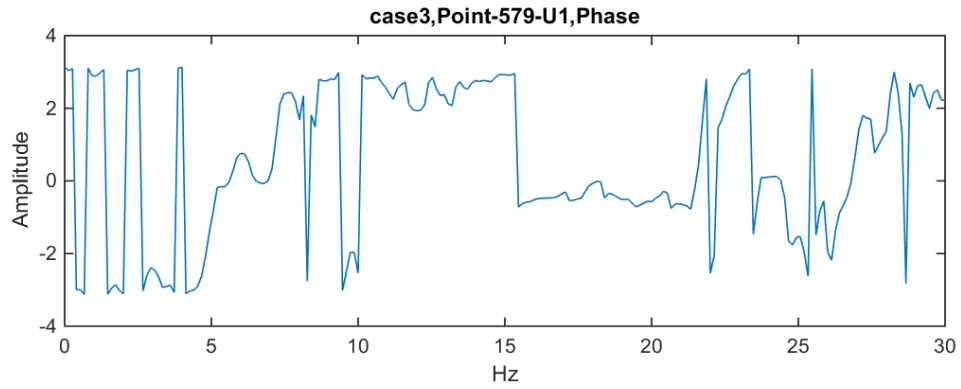

case3,Point-610-U1,Amplitude
Amplitude
Hz
0
5
10
15
20
25
30

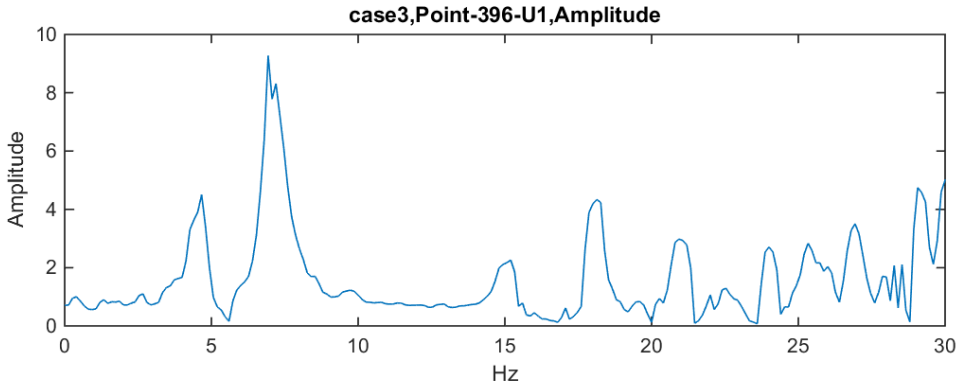

case3,Point-610-U1,Phase
Amplitude
Hz
-4
-2
0
2
4

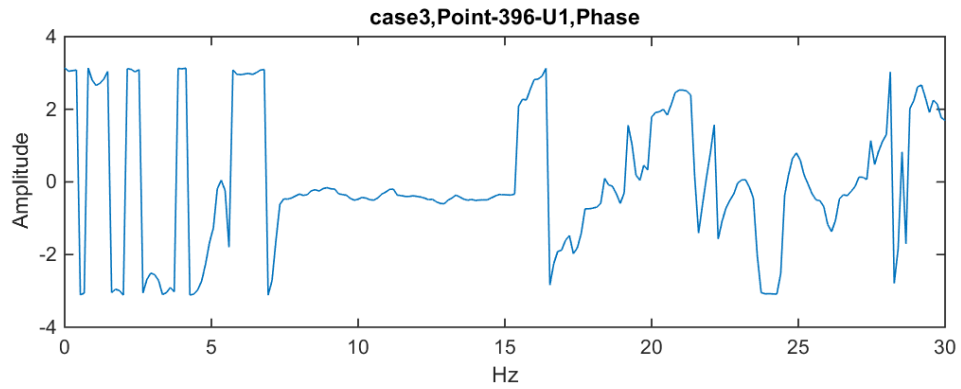

case3,Point-427-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
5
6

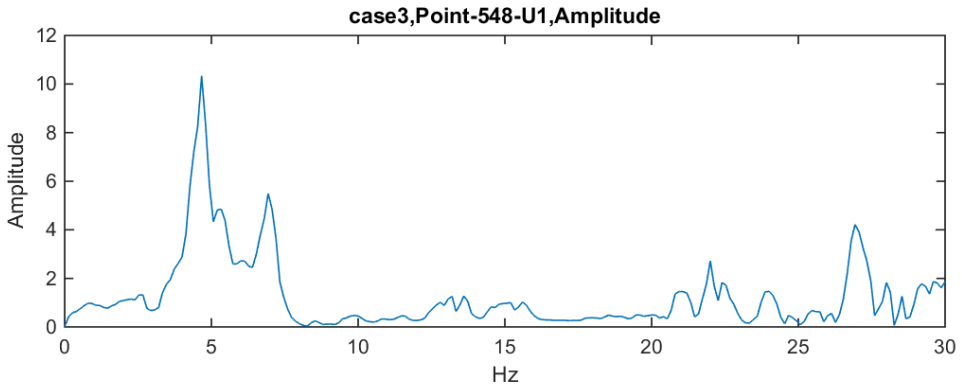

case3,Point-427-U1,Phase
Amplitude
Hz
-4
-2
0
2
4

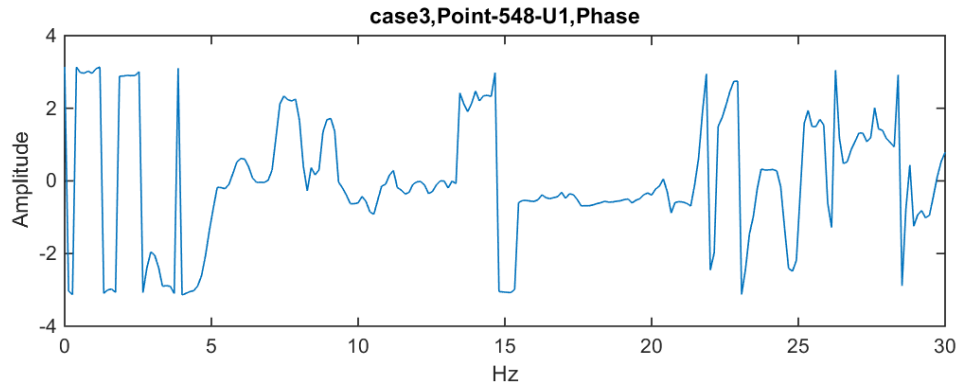

case3,Point-579-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
0
5
10
15
20
25
30

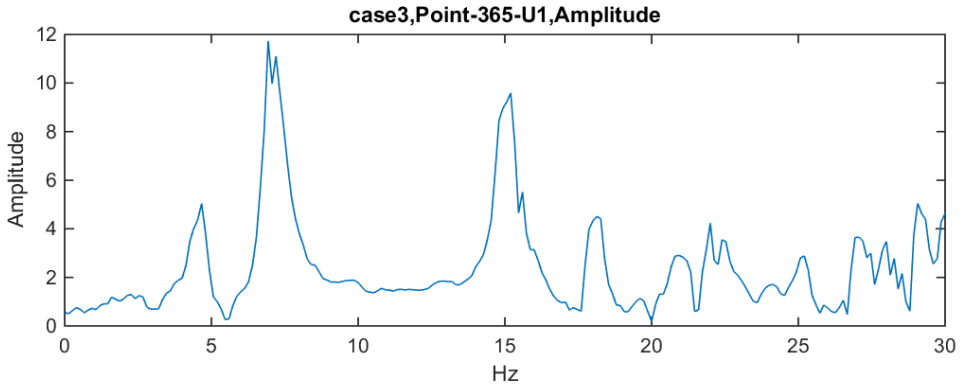

case3,Point-579-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

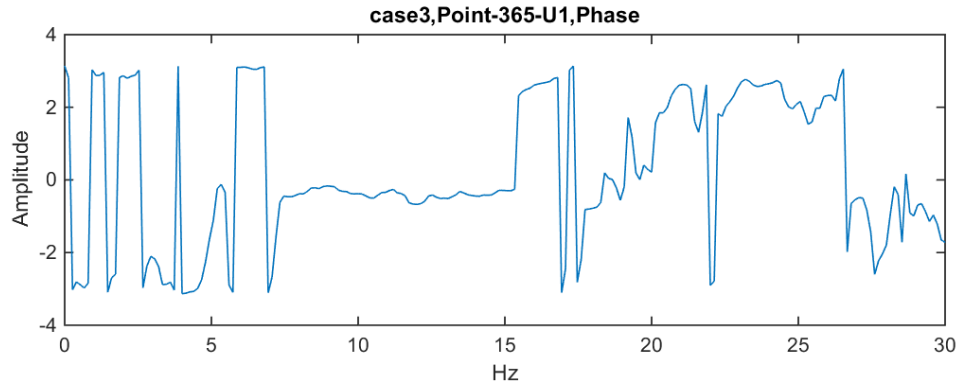

case3,Point-396-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
0
5
10
15
20
25
30

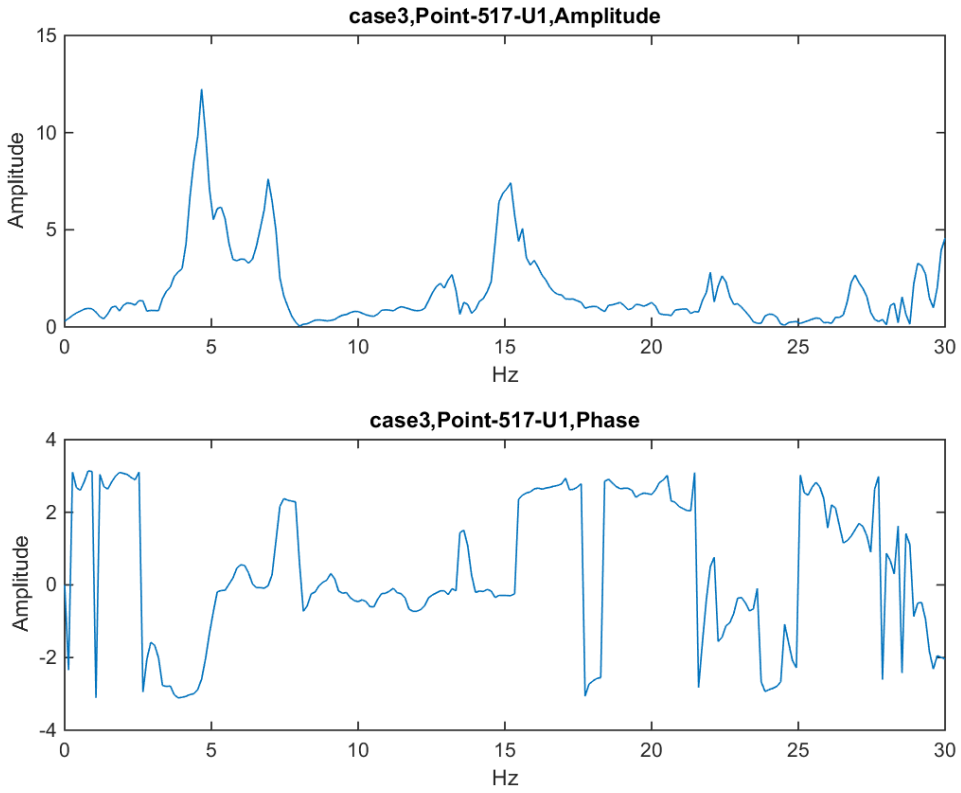

case3,Point-396-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case3,Point-548-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

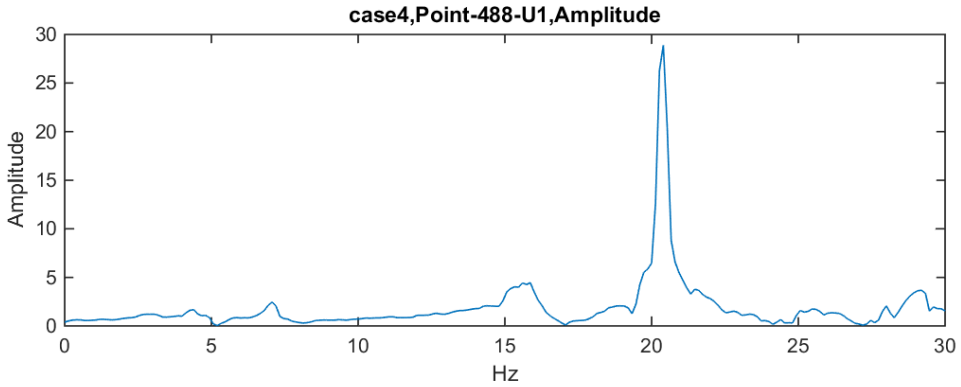

case3,Point-548-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

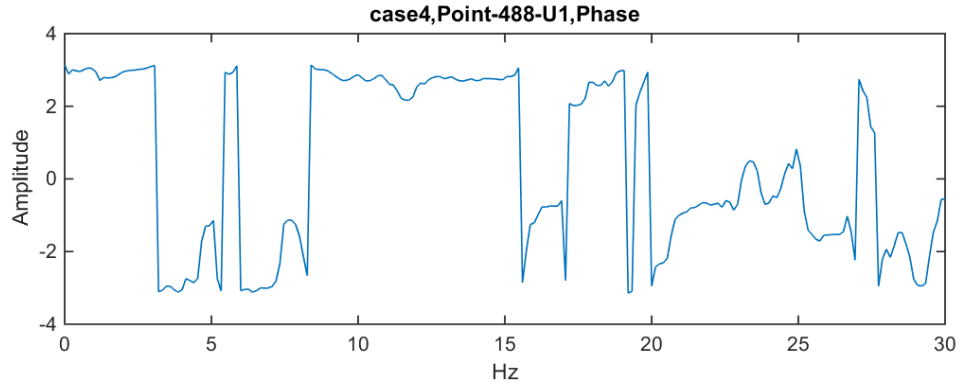

case3,Point-365-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

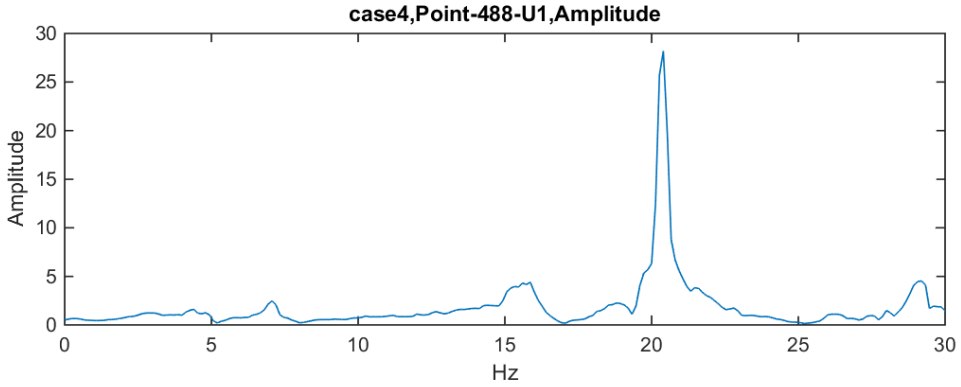

case3,Point-365-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

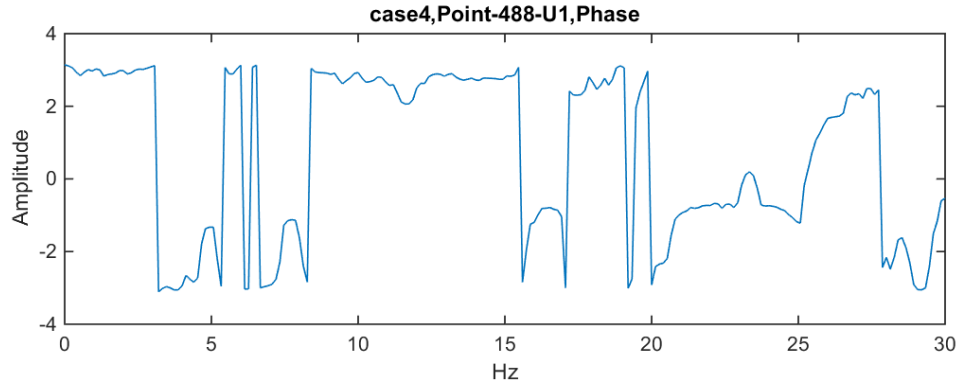

case3,Point-517-U1,Amplitude
Amplitude
Hz
case3,Point-517-U1,Phase
Amplitude
Hz

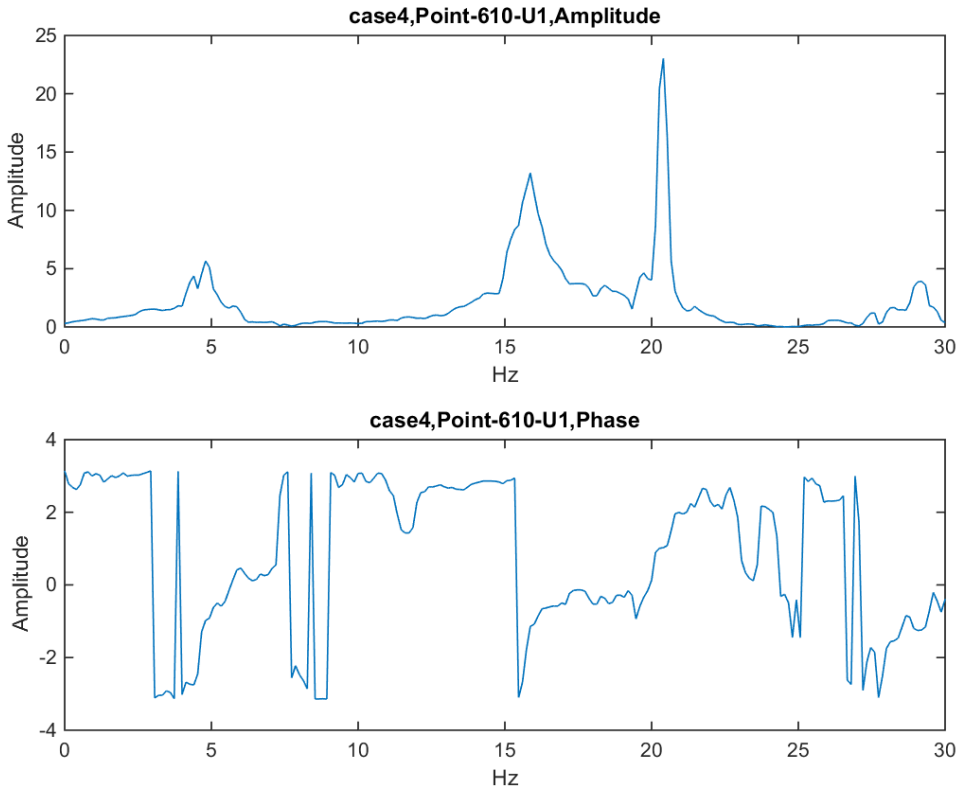
## 3.4. CASE 4

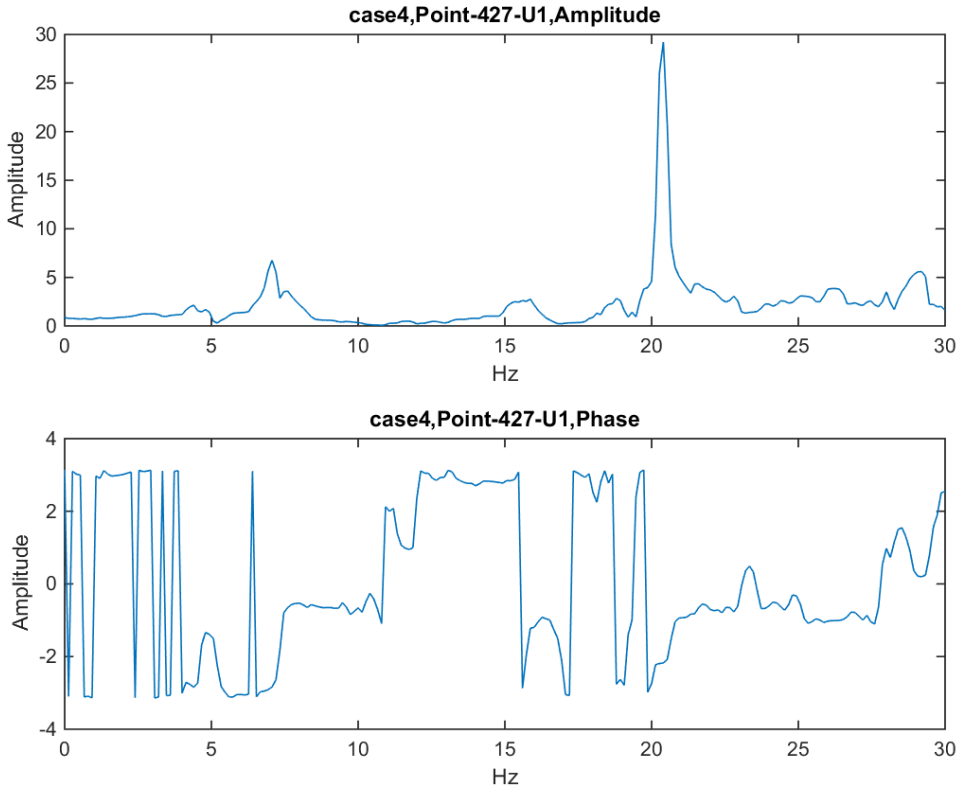

case4,Point-488-U1,Amplitude
Amplitude
Hz
0
5
10
15
20
25
30

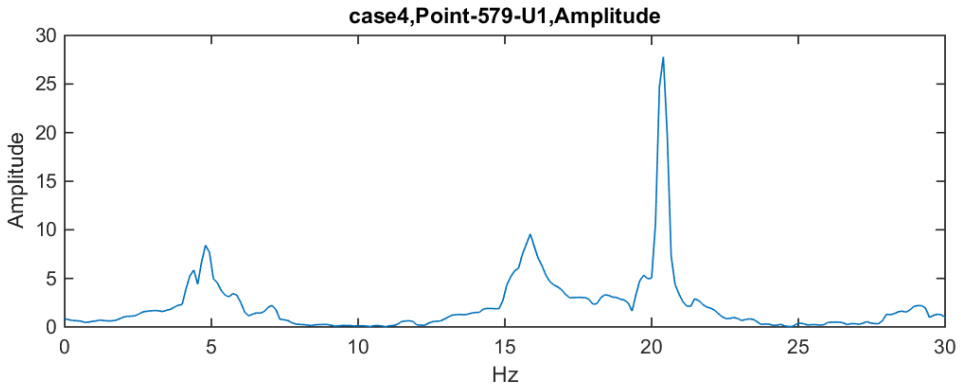

case4,Point-488-U1,Phase
Amplitude
Hz
4
2
0
-2
-4
0
5
10
15
20
25
30

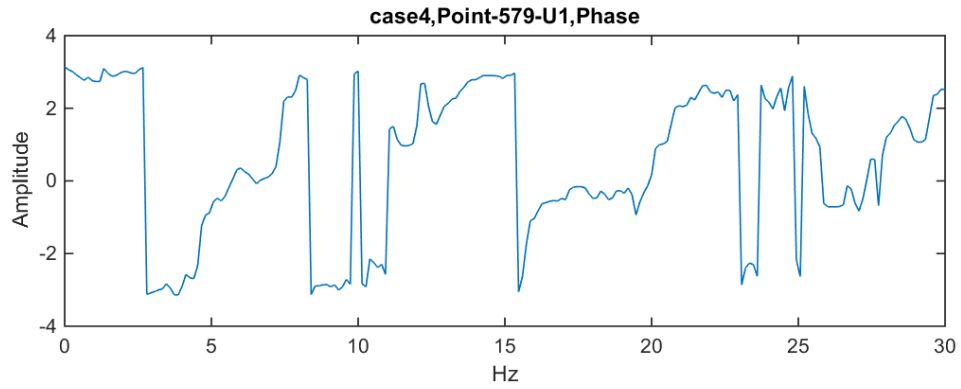

case4,Point-488-U1,Amplitude
Amplitude
Hz
0
5
10
15
20
25
30

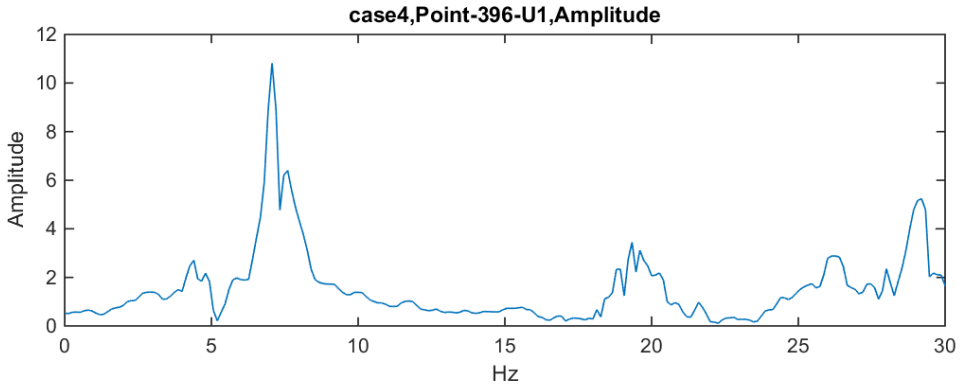

case4,Point-488-U1,Phase
Amplitude
Hz
4
2
0
-2
-4
0
5
10
15
20
25
30


case4,Point-610-U1,Amplitude
Amplitude
Hz
case4,Point-610-U1,Phase
Amplitude
Hz


case4,Point-427-U1,Amplitude
Amplitude
Hz
case4,Point-427-U1,Phase
Amplitude
Hz


case4,Point-579-U1,Amplitude
Amplitude
Hz
0
5
10
15
20
25
30


case4,Point-579-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case4,Point-396-U1,Amplitude
Amplitude
Hz
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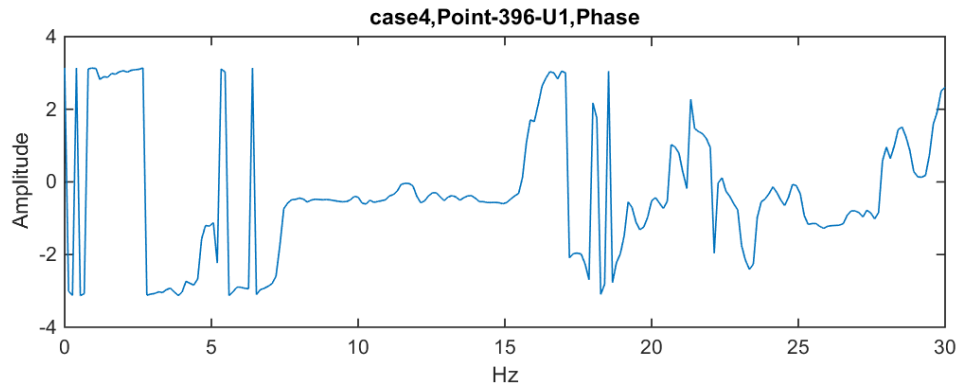
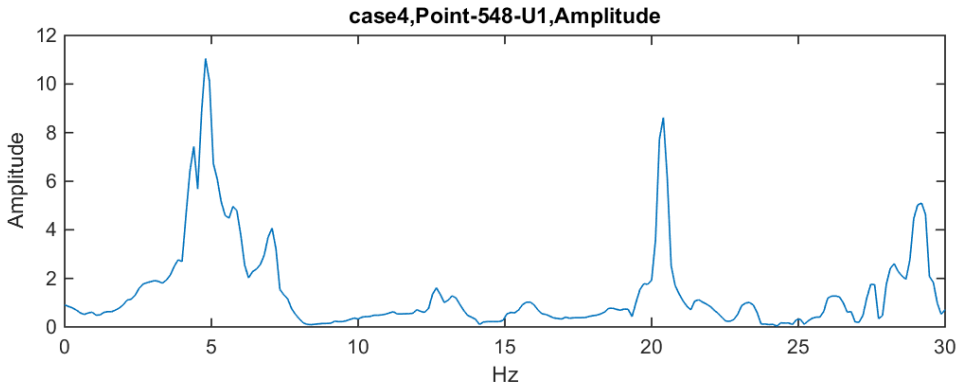
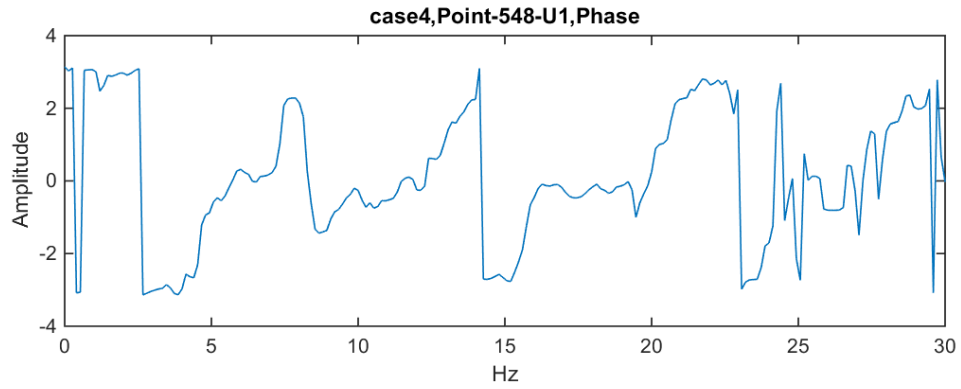
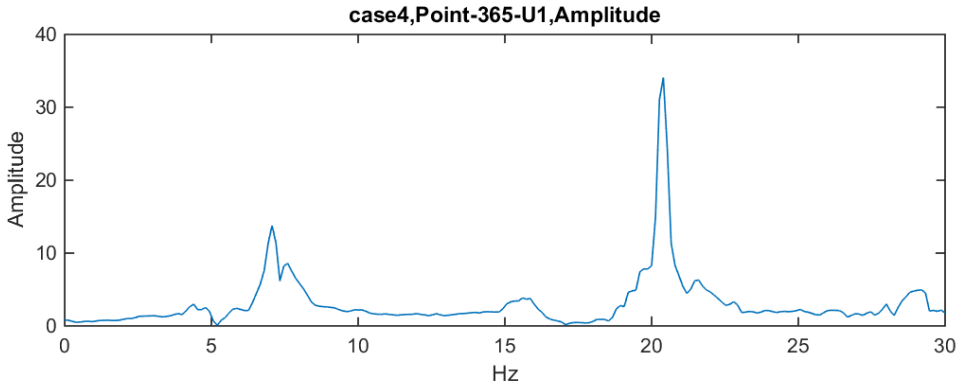
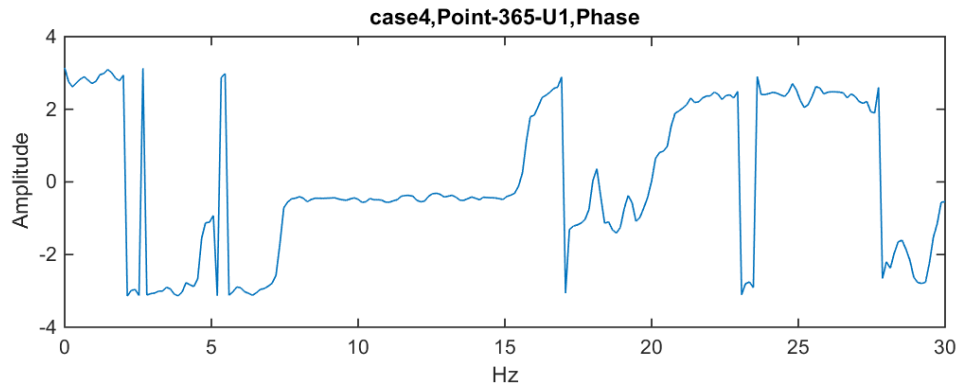
2
4
6
8
10
12
0
5
10
15
20
25
30

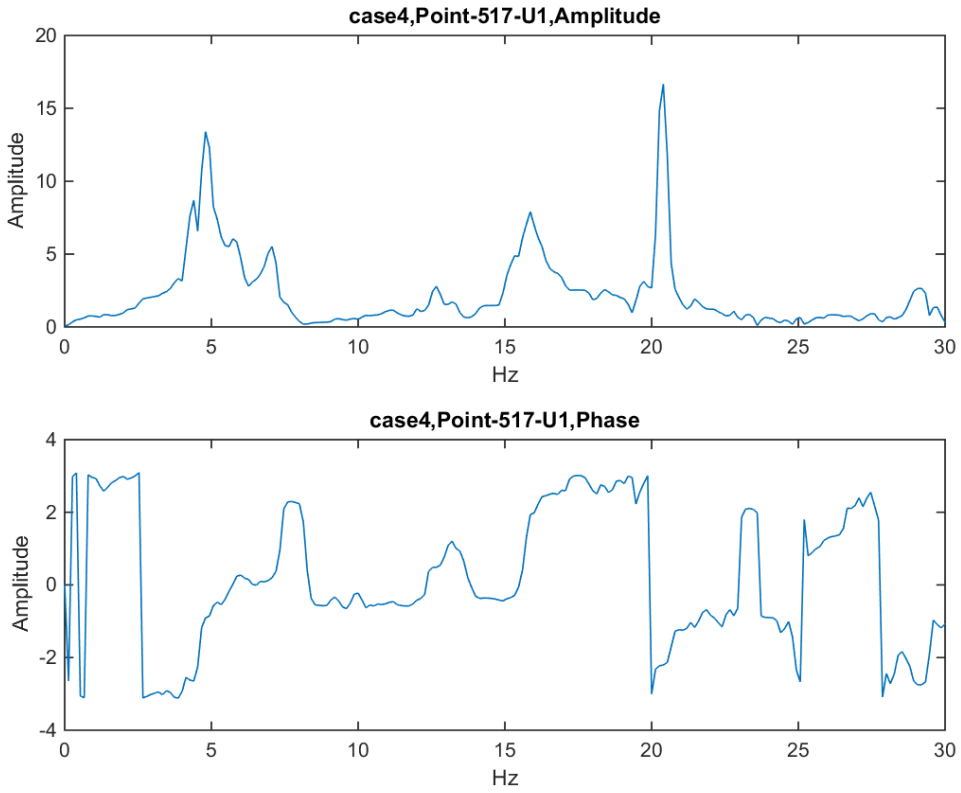

case4,Point-396-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case4,Point-548-U1,Amplitude
Amplitude
Hz


case4,Point-548-U1,Phase
Amplitude
Hz

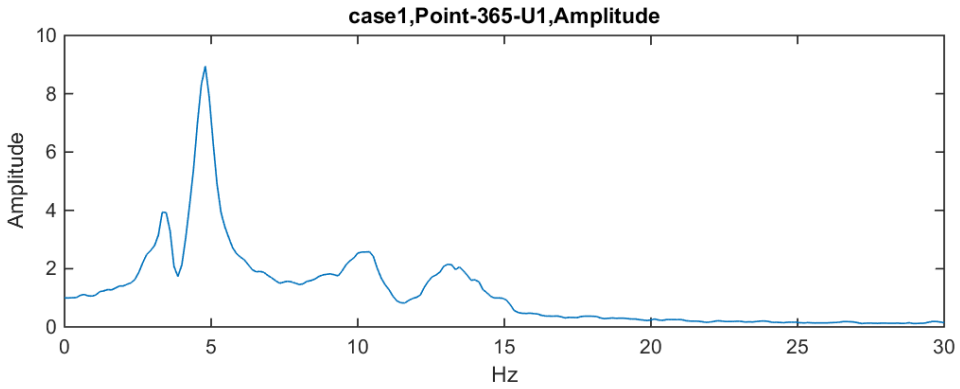

case4,Point-365-U1,Amplitude
Amplitude
Hz

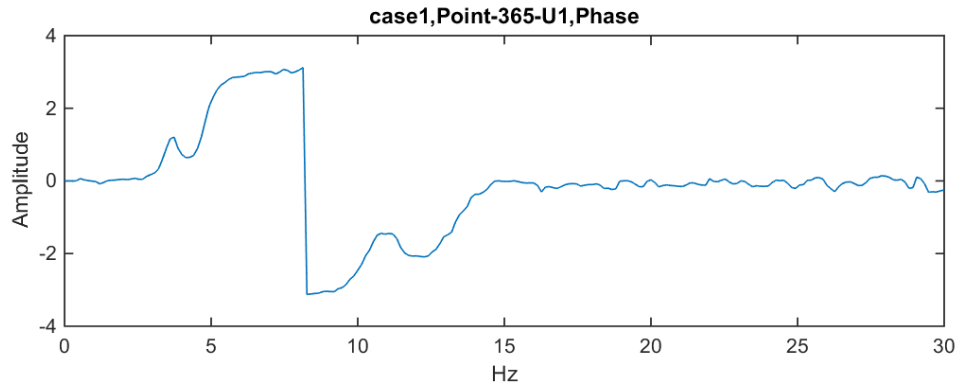

case4,Point-365-U1,Phase
Amplitude
Hz

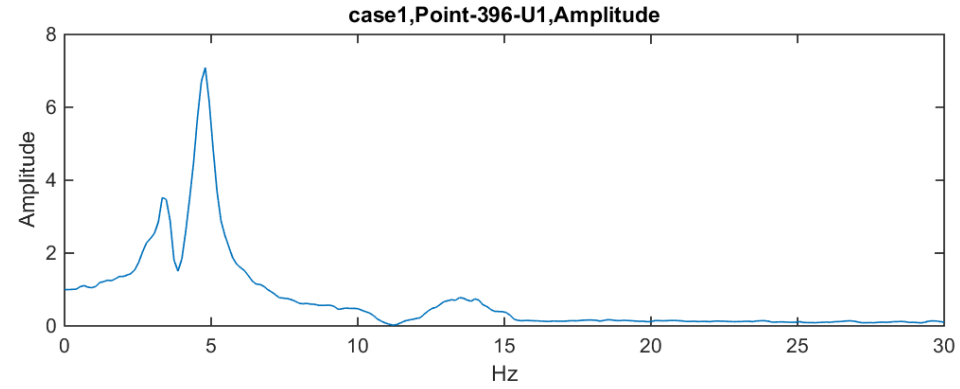

case4,Point-517-U1,Amplitude
Amplitude
Hz
case4,Point-517-U1,Phase
Amplitude
Hz

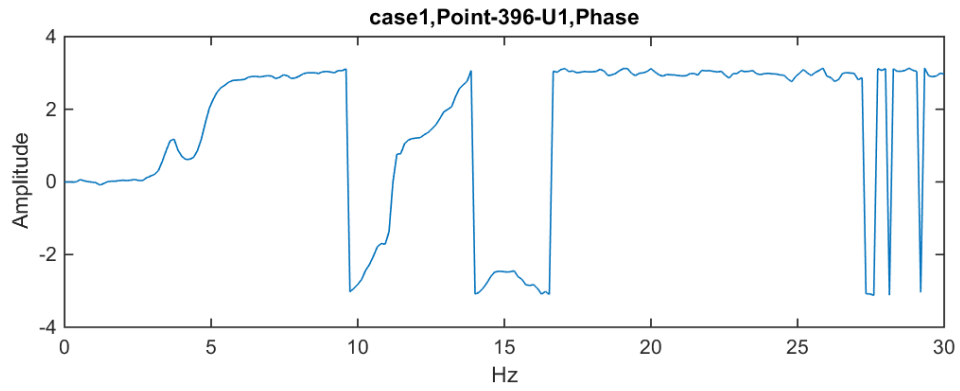
# 4. TRANSFER FUNCTION OF SAP RESULTS

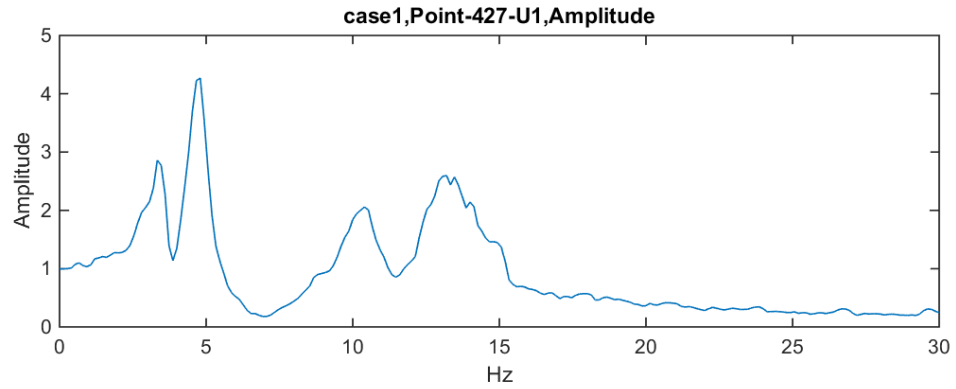
## 4.1. CASE 1

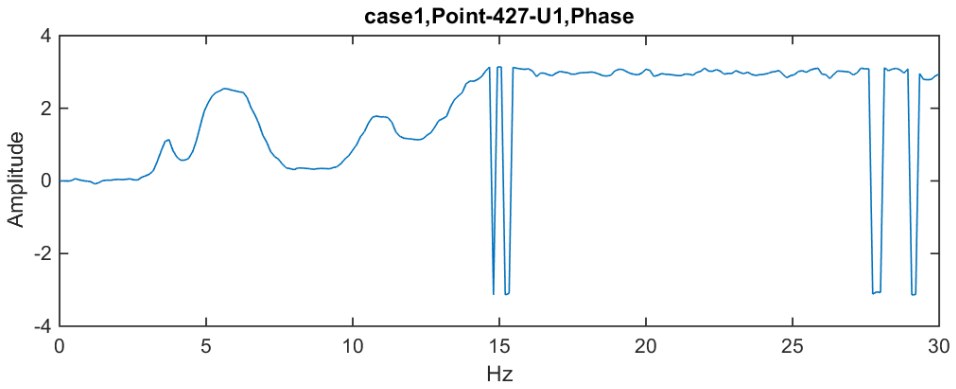


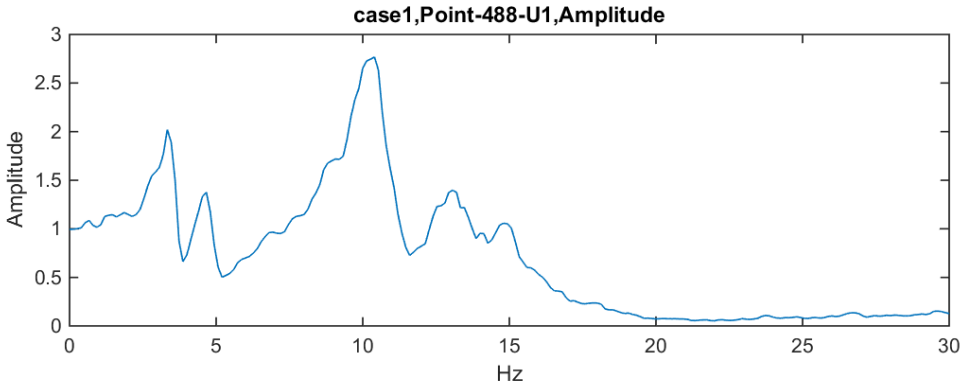



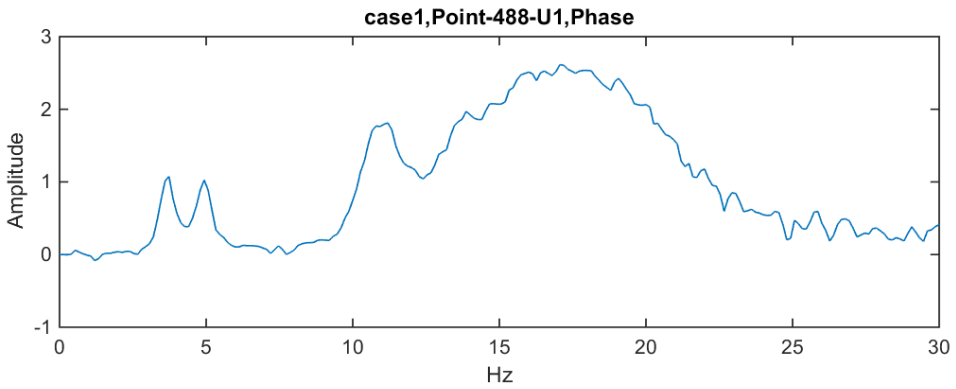



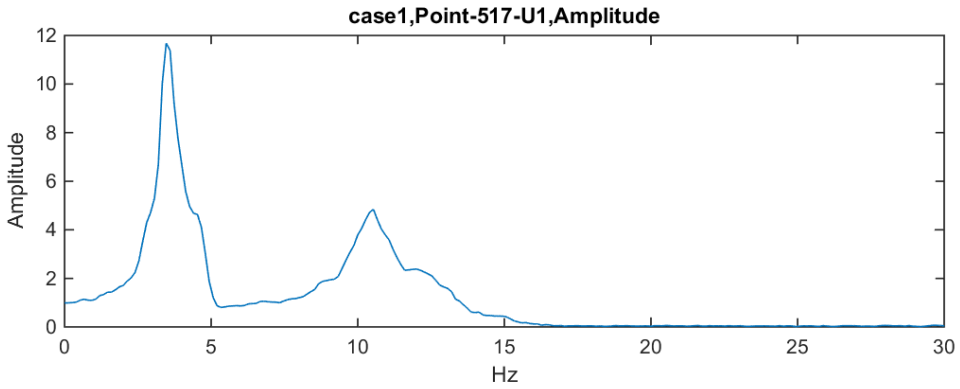



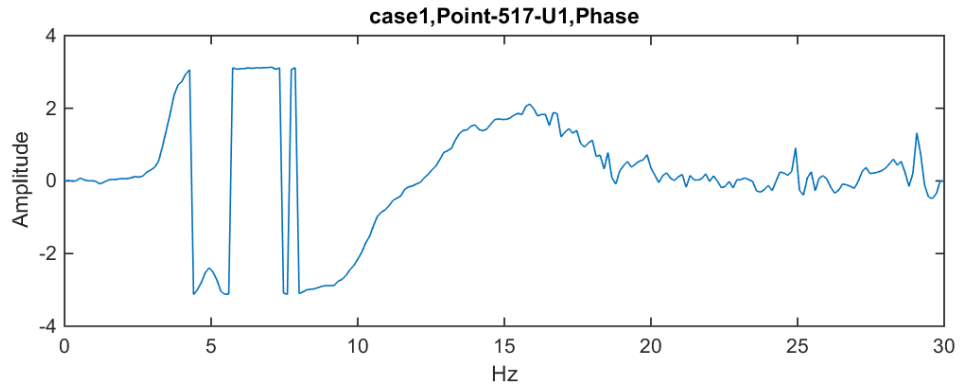

case1,Point-427-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
5
0
5
10
15
20
25
30

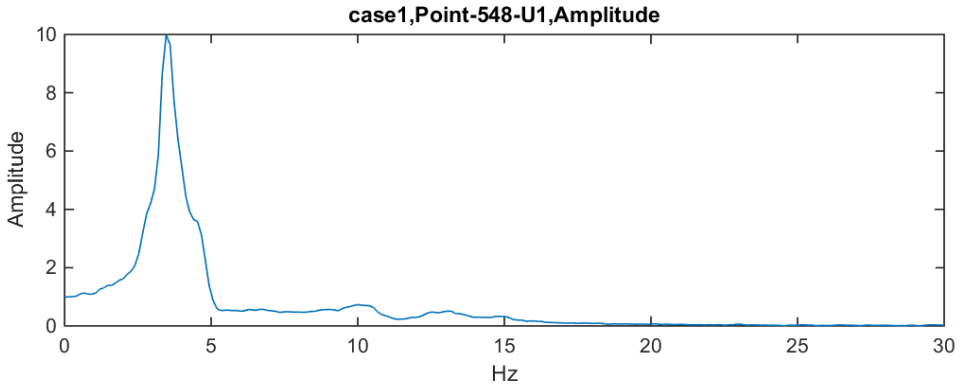

case1,Point-427-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

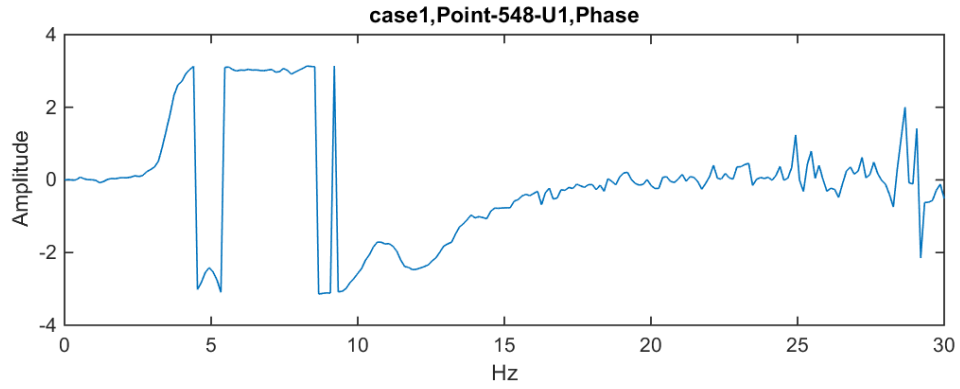

case1,Point-488-U1,Amplitude
Amplitude
Hz
0
0.5
1
1.5
2
2.5
3
0
5
10
15
20
25
30

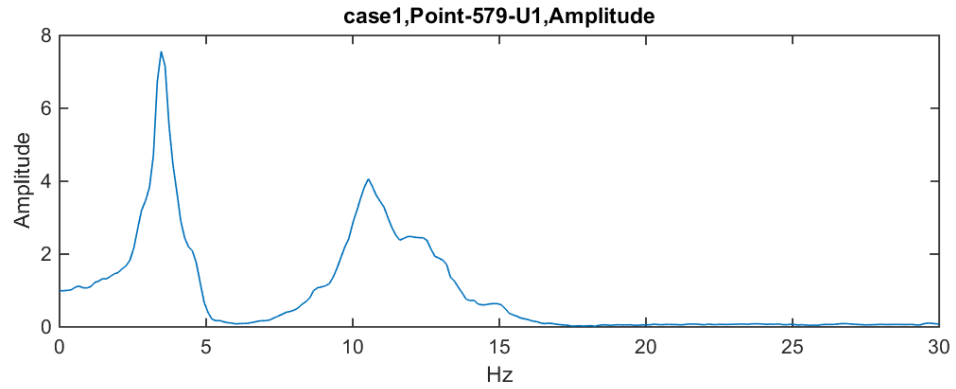

case1,Point-488-U1,Phase
Amplitude
Hz
-1
0
1
2
3
0
5
10
15
20
25
30

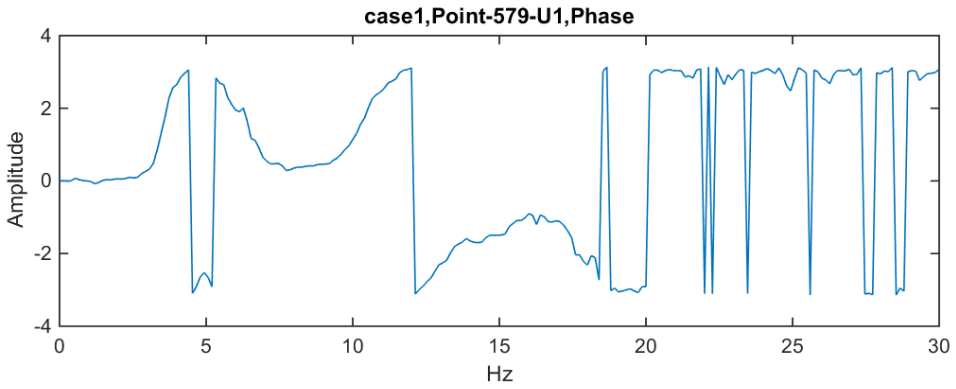

case1,Point-517-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

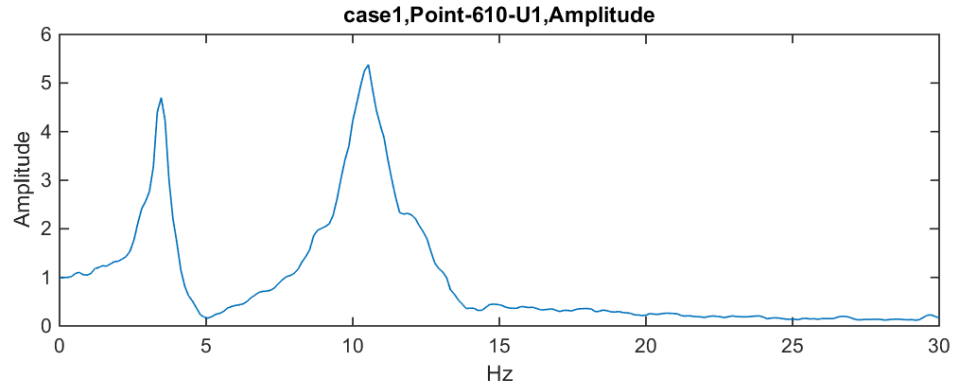

case1,Point-517-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

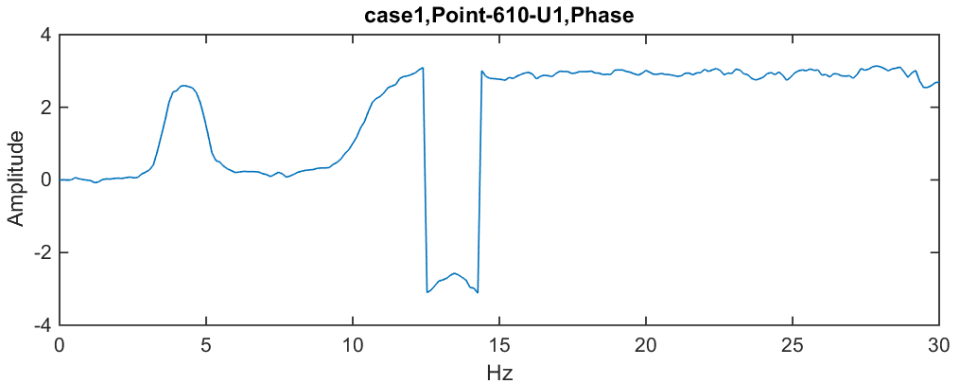

case1,Point-548-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
0
5
10
15
20
25
30

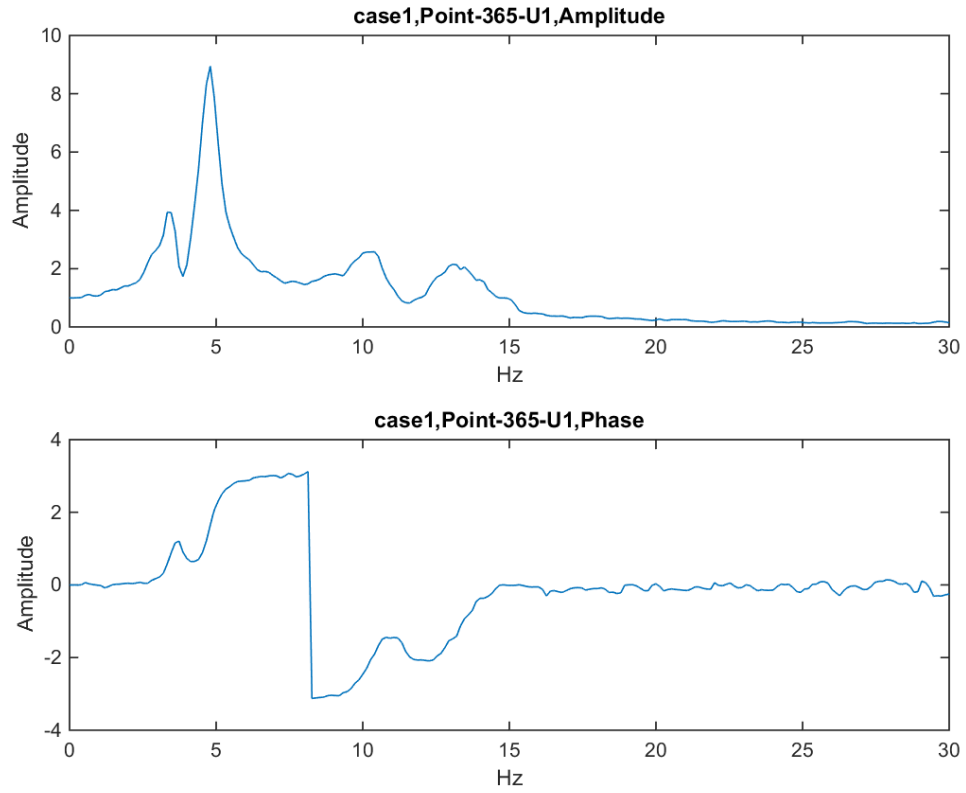

case1,Point-548-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case1,Point-579-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
0
5
10
15
20
25
30

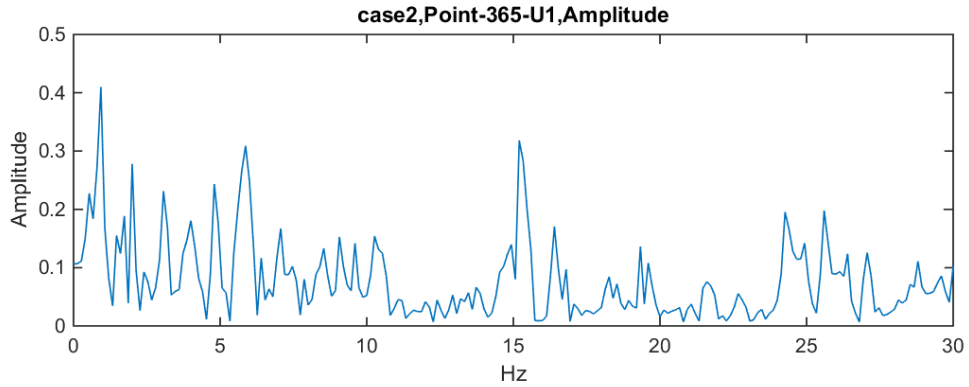

case1,Point-579-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

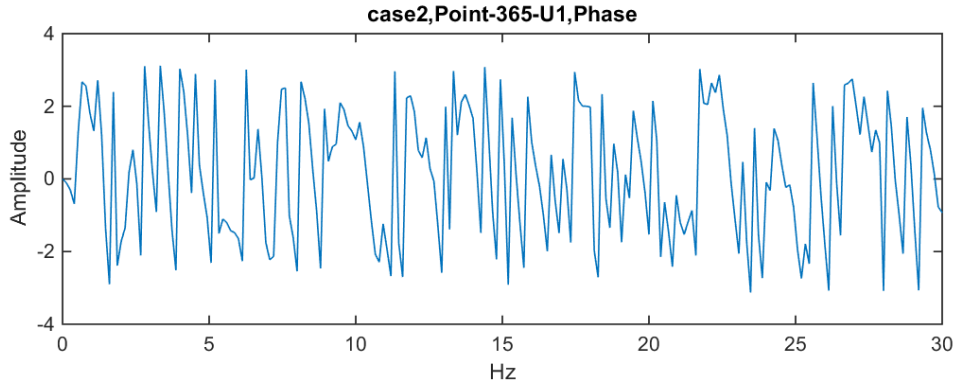

case1,Point-610-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
5
6
0
5
10
15
20
25
30

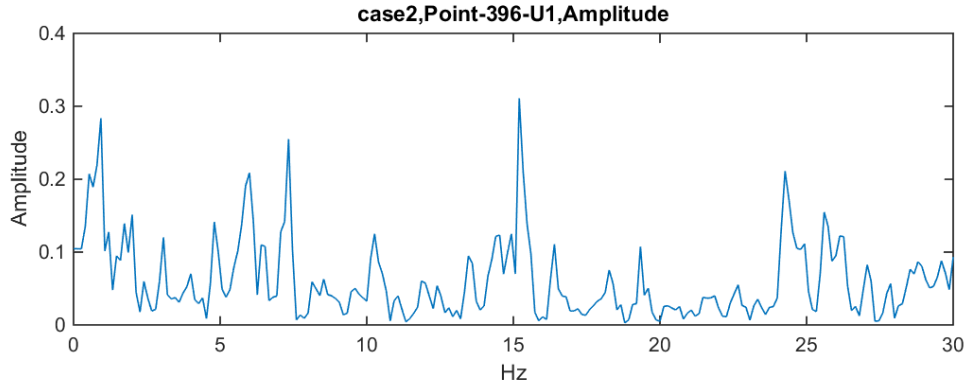

case1,Point-610-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

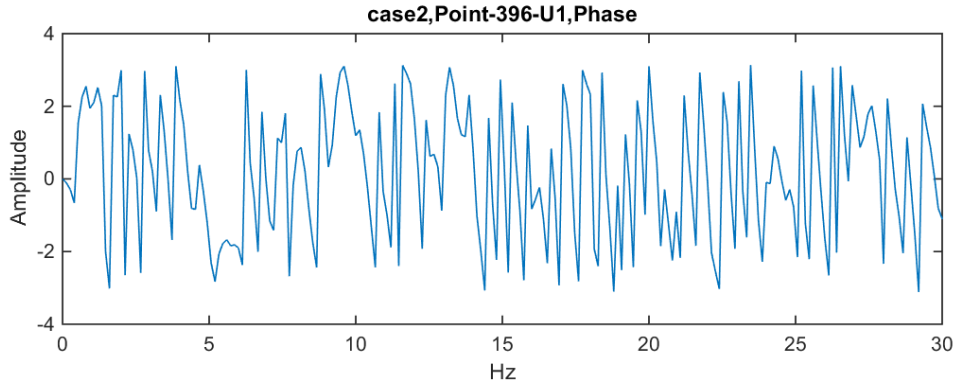

case1,Point-365-U1,Amplitude
Amplitude
Hz
case1,Point-365-U1,Phase
Amplitude
Hz

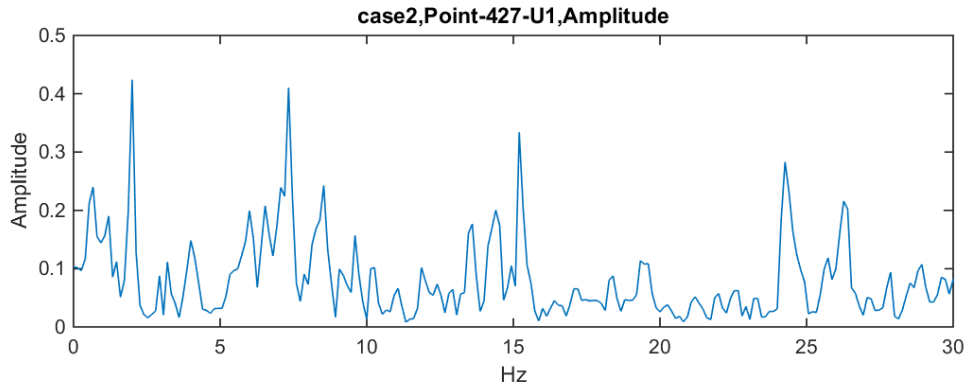
## 4.2. CASE 2

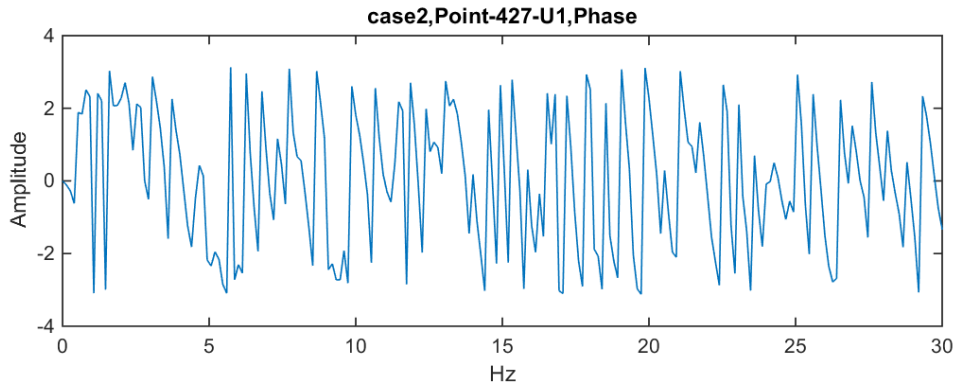

case2,Point-365-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
25
30

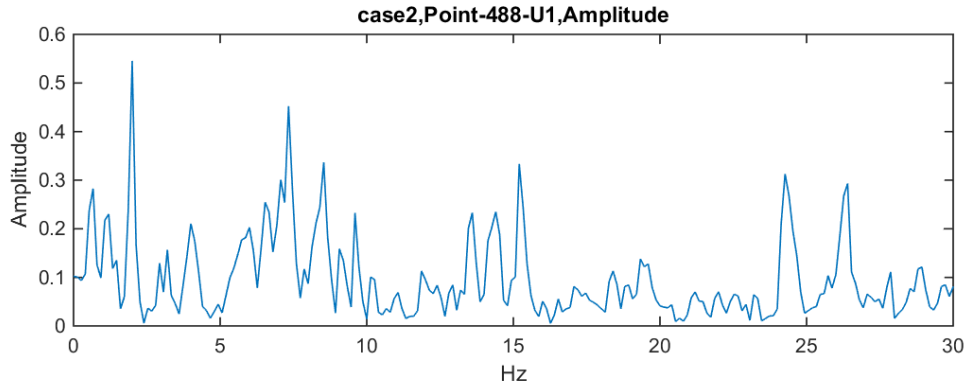

case2,Point-365-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case2,Point-396-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0
5
10
15
20
25
30


case2,Point-396-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case2,Point-427-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
25
30


case2,Point-427-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30


case2,Point-488-U1,Amplitude
Amplitude
Hz
0
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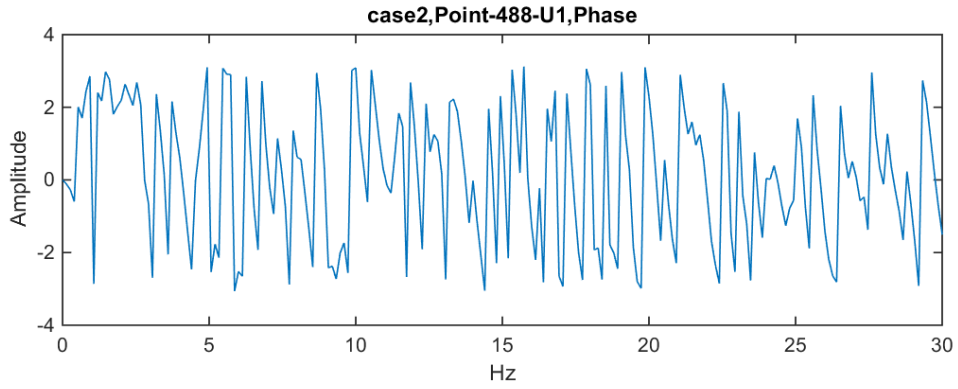
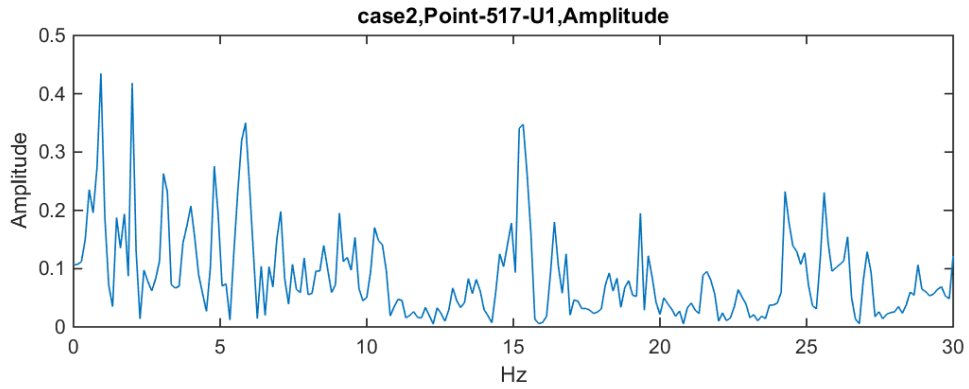
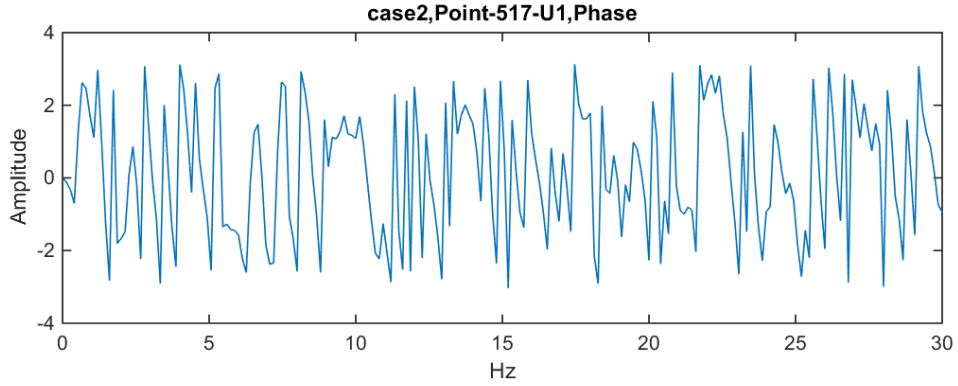
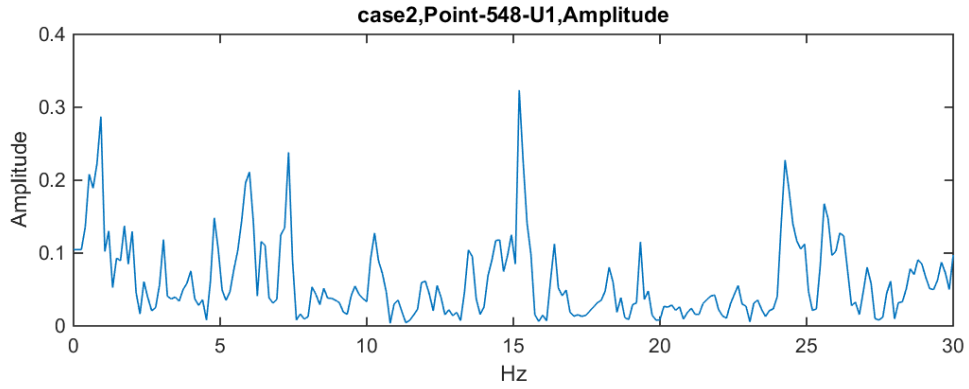
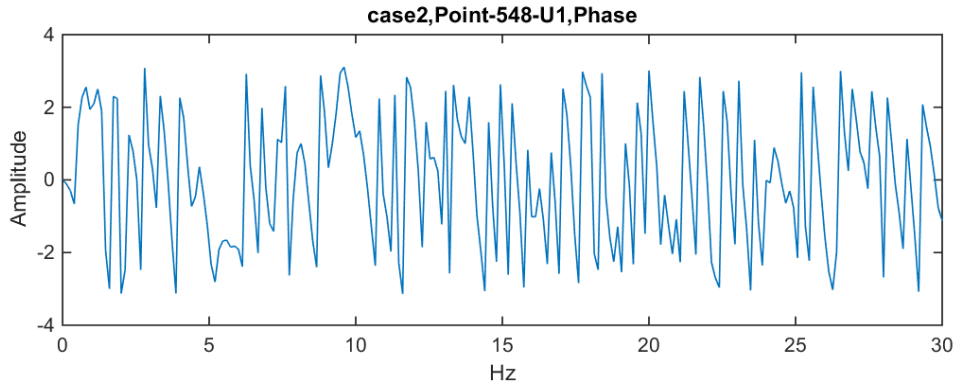
0.2
0.3
0.4
0.5
0.6
0
5
10
15
20
25
30

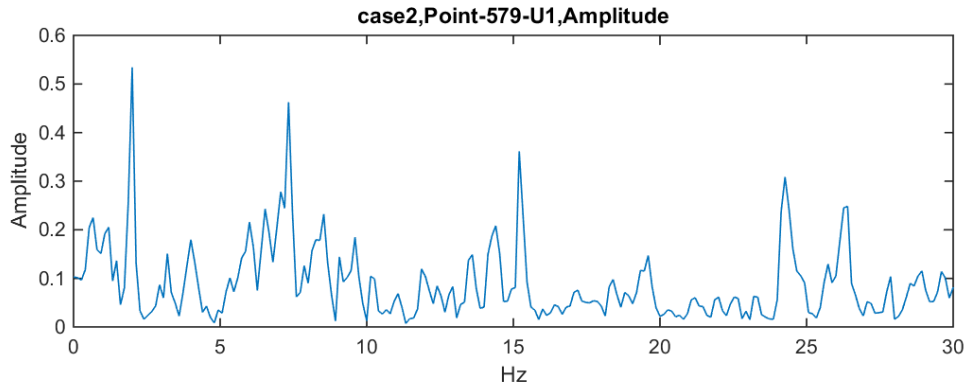

case2,Point-488-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

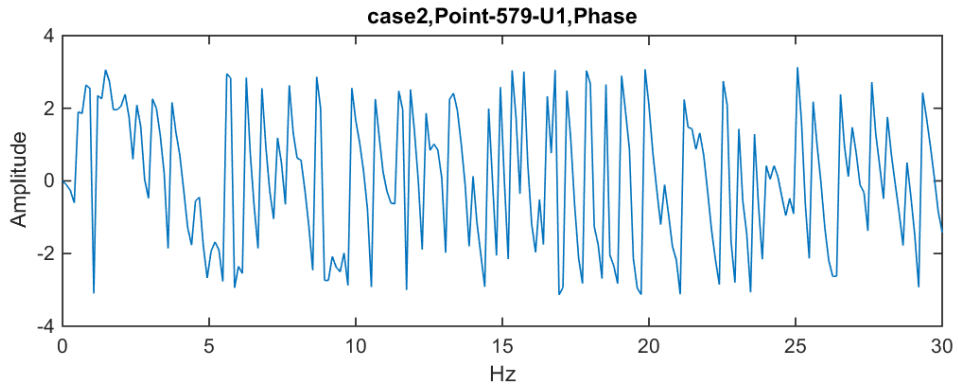

case2,Point-517-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
25
30

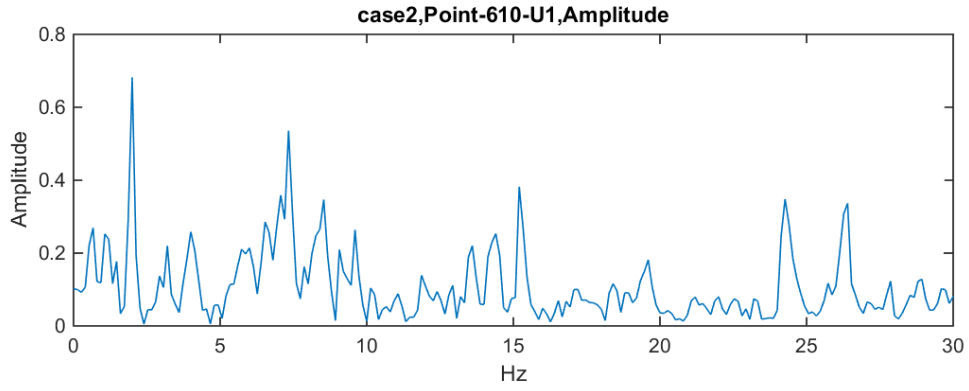

case2,Point-517-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

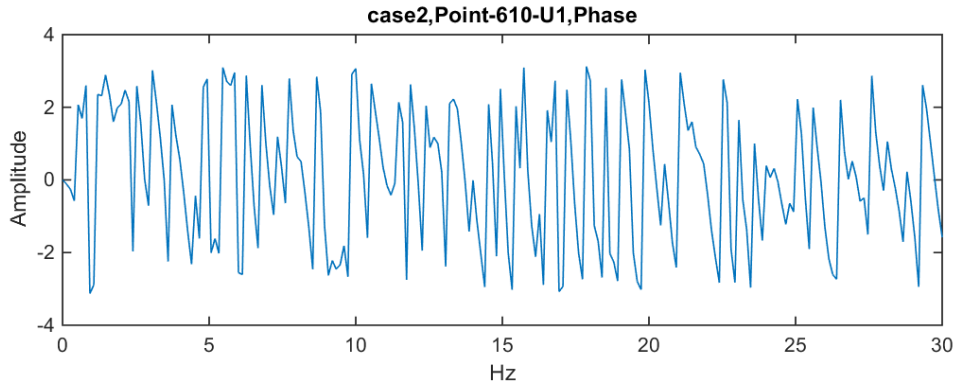

case2,Point-548-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0
5
10
15
20
25
30


case2,Point-548-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

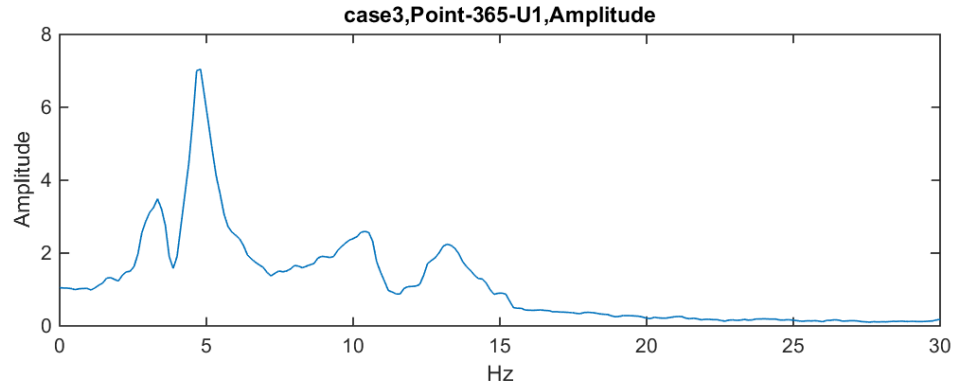

case2,Point-579-U1,Amplitude
Amplitude
Hz
0
0.1
0.2
0.3
0.4
0.5
0.6
0
5
10
15
20
25
30

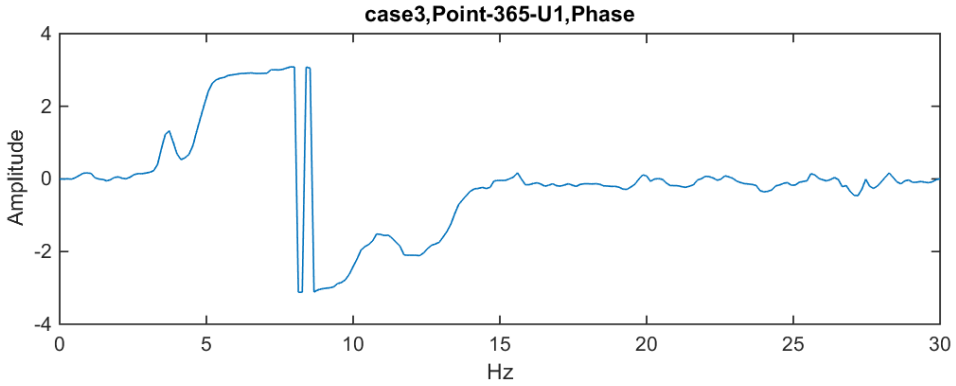

case2,Point-579-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

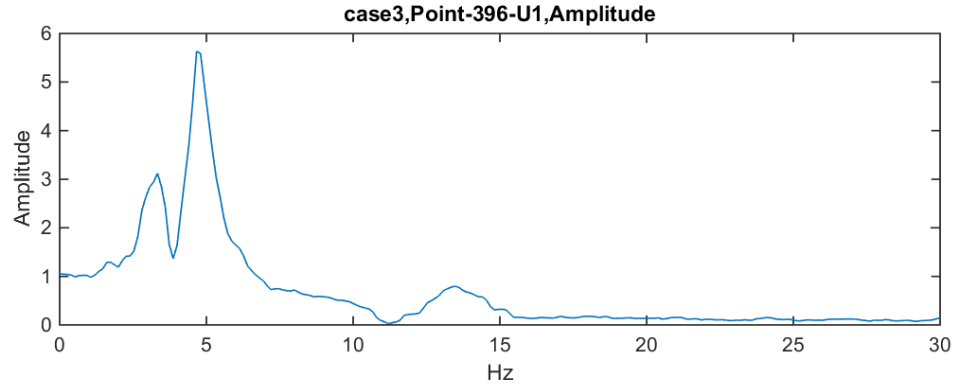

case2,Point-610-U1,Amplitude
Amplitude
Hz
0
0.2
0.4
0.6
0.8
0
5
10
15
20
25
30

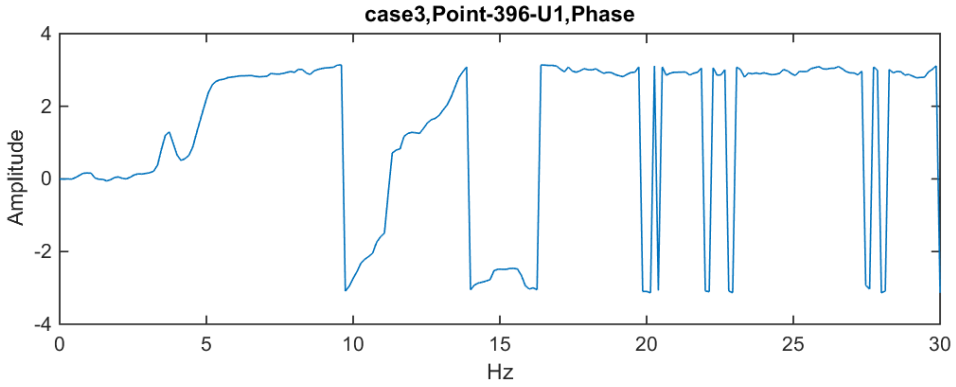

case2,Point-610-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

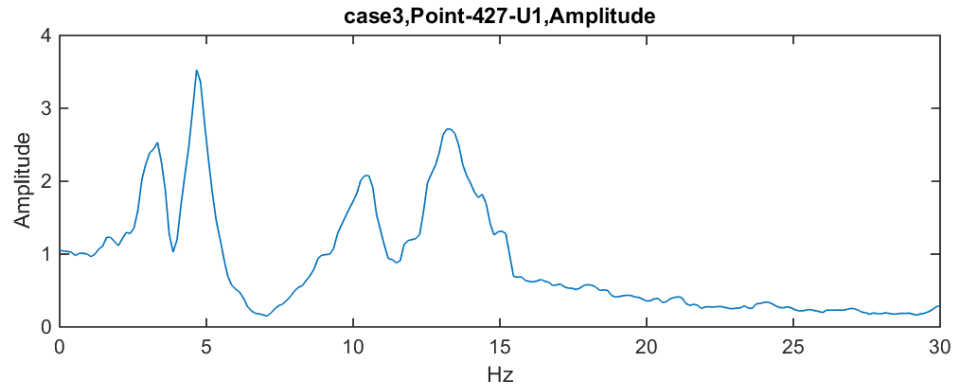
## 4.3. CASE 3

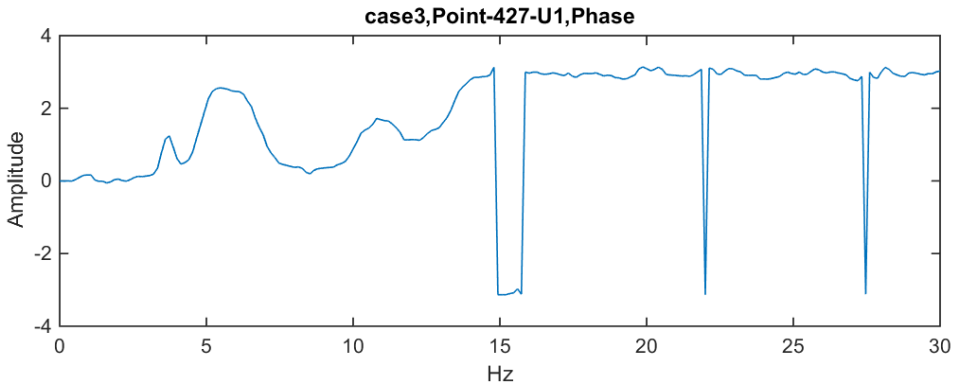

case3,Point-365-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
0
5
10
15
20
25
30

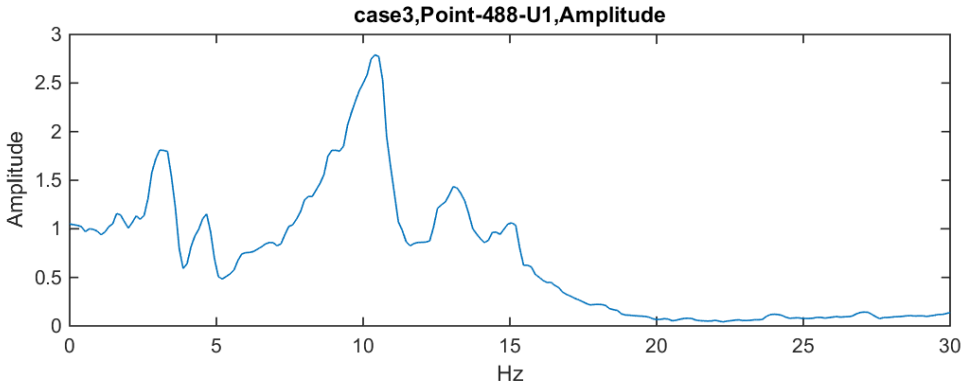

case3,Point-365-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

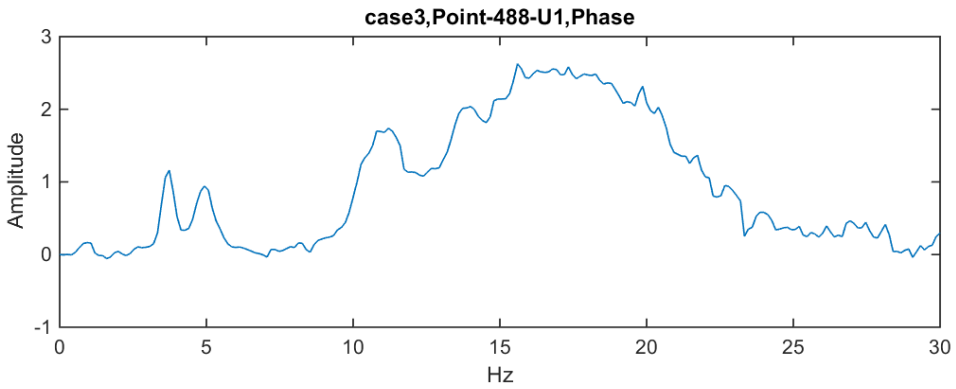

case3,Point-396-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
5
6
0
5
10
15
20
25
30

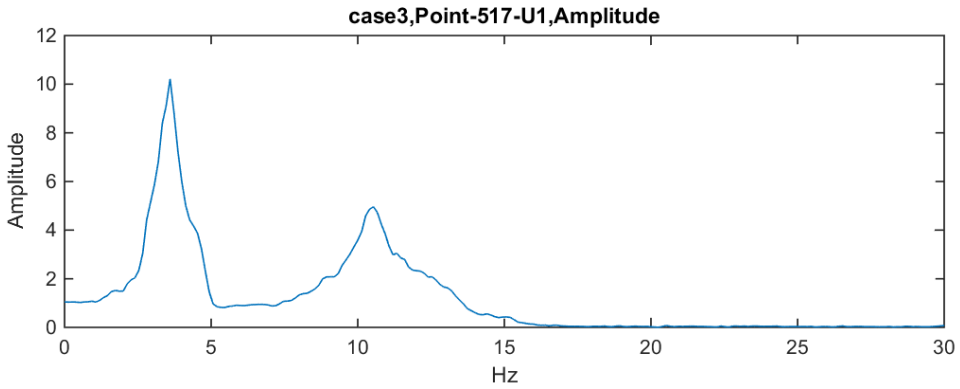

case3,Point-396-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

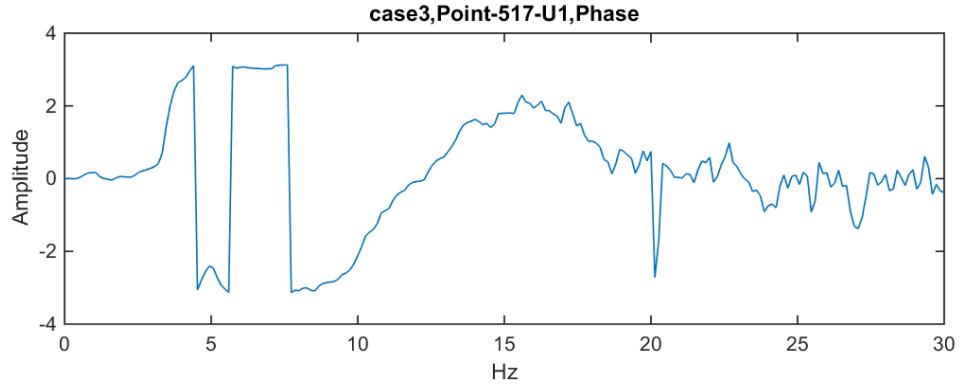

case3,Point-427-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
0
5
10
15
20
25
30

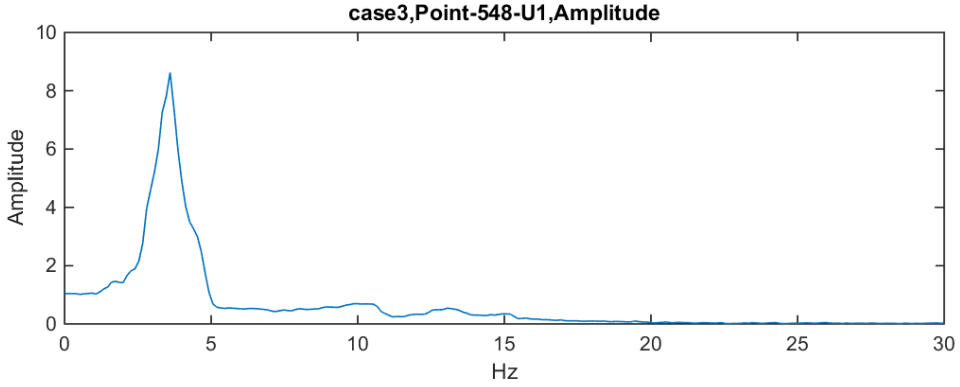

case3,Point-427-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

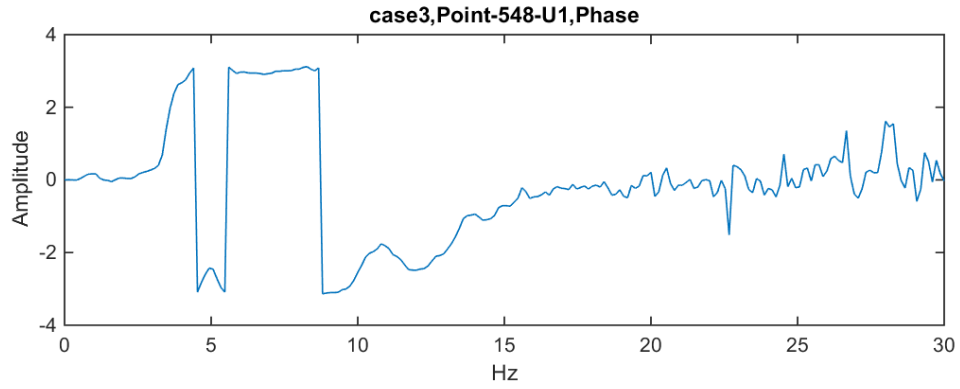

case3,Point-488-U1,Amplitude
Amplitude
Hz
0
0.5
1
1.5
2
2.5
3
0
5
10
15
20
25
30

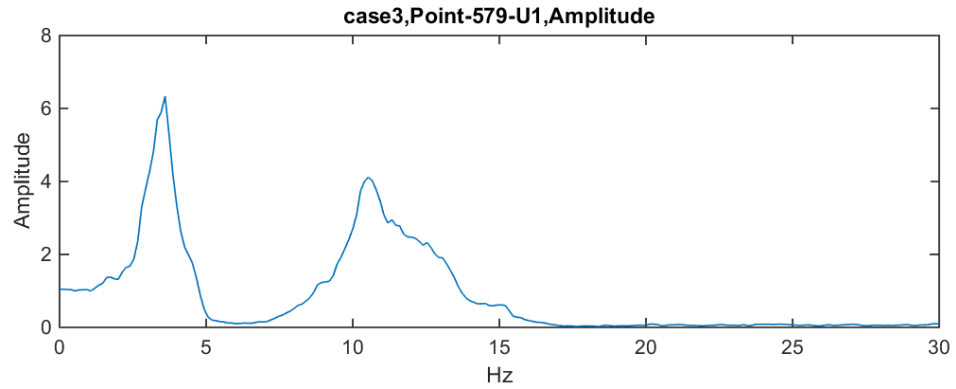

case3,Point-488-U1,Phase
Amplitude
Hz
-1
0
1
2
3
0
5
10
15
20
25
30

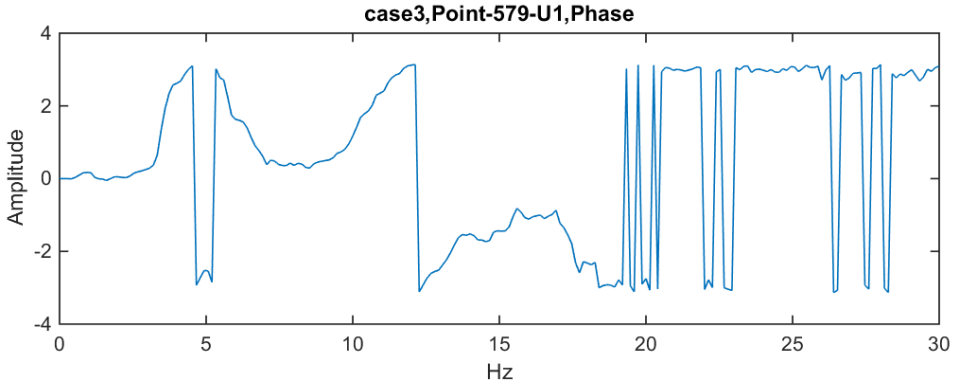

case3,Point-517-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
12
0
5
10
15
20
25
30

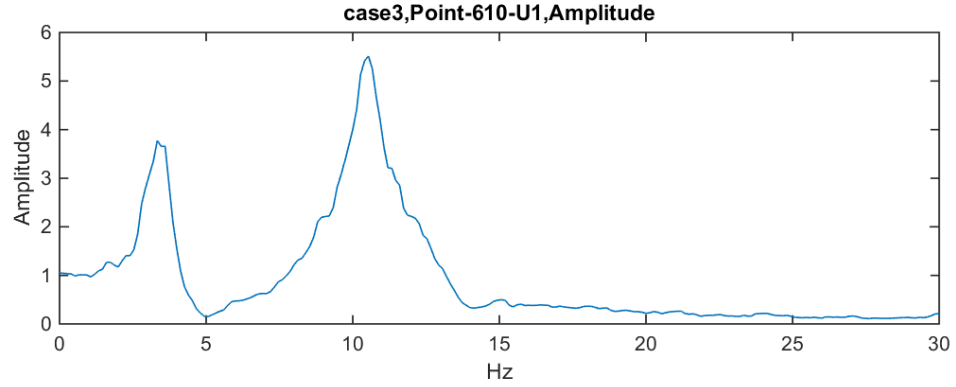

case3,Point-517-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

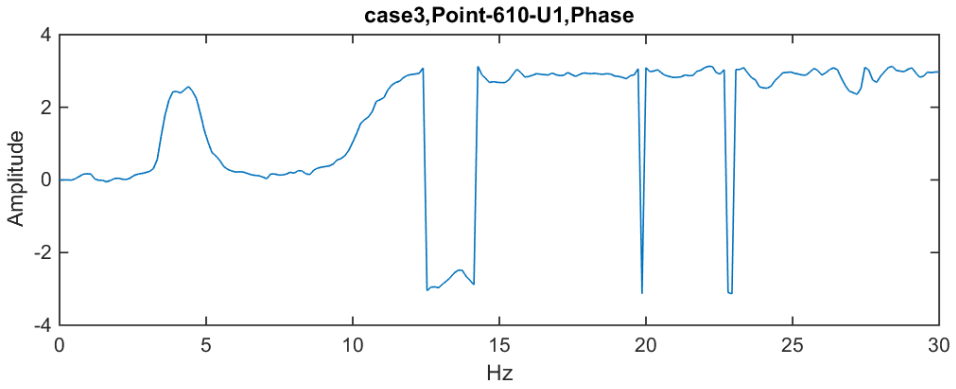

case3,Point-548-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
0
5
10
15
20
25
30


case3,Point-548-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

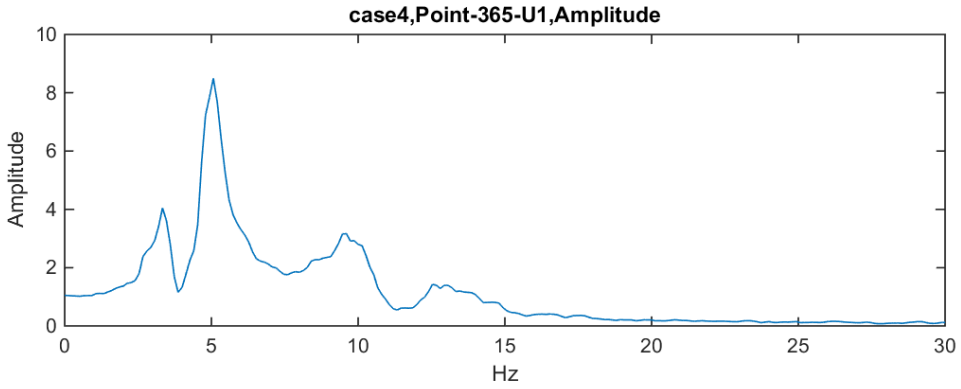

case3,Point-579-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
0
5
10
15
20
25
30

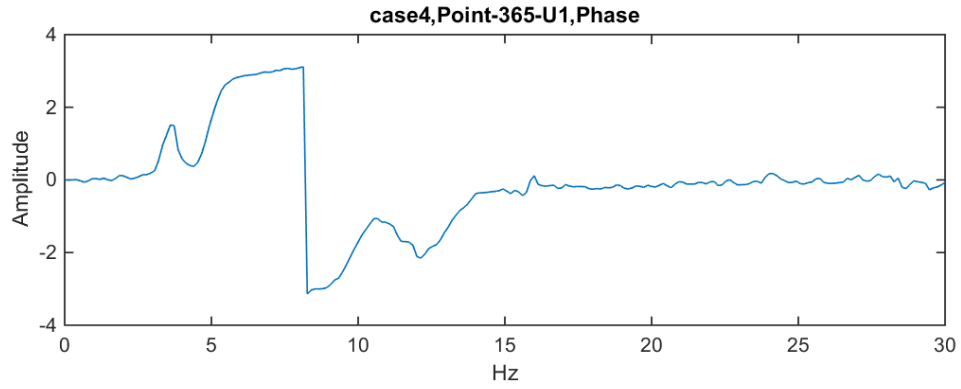

case3,Point-579-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

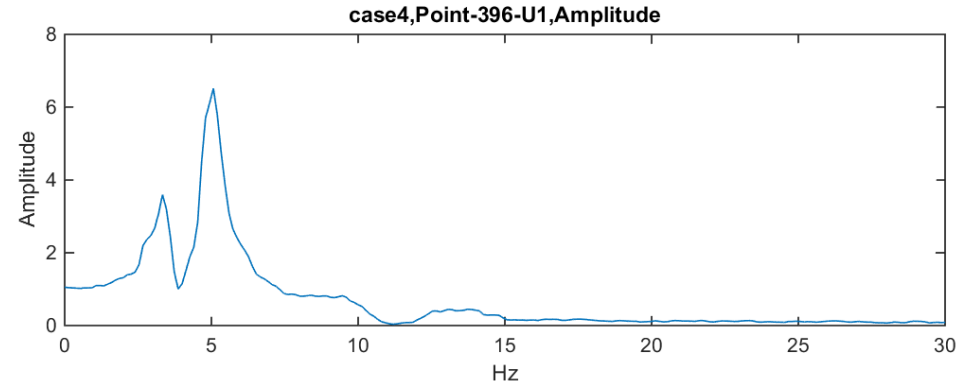

case3,Point-610-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
5
6
0
5
10
15
20
25
30

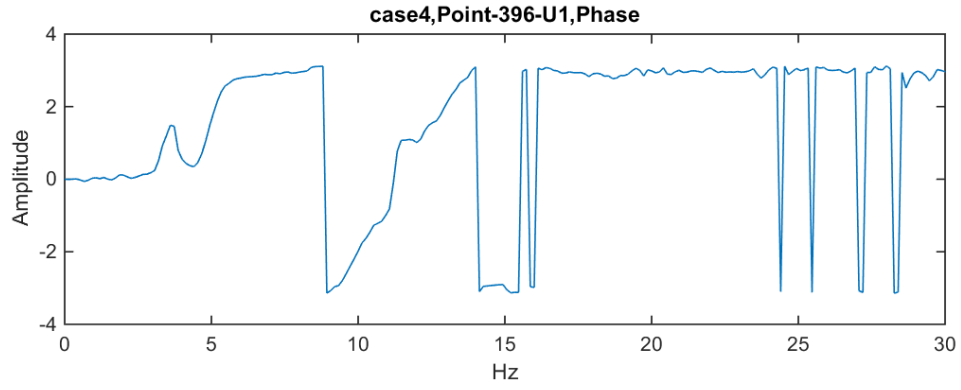

case3,Point-610-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

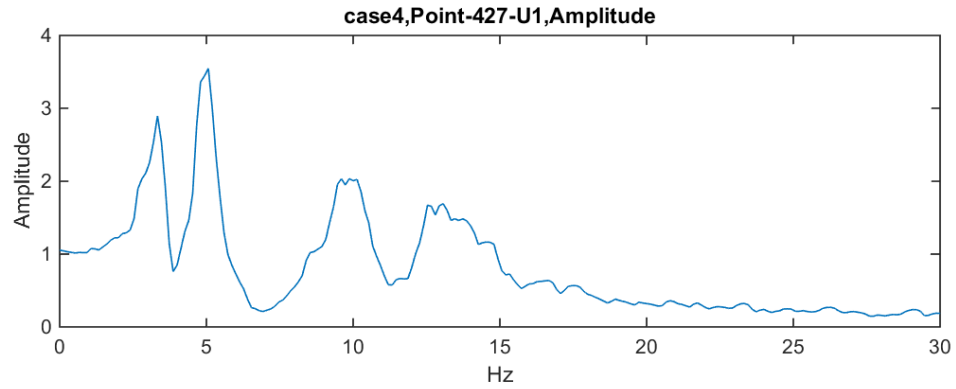
## 4.4. CASE 4

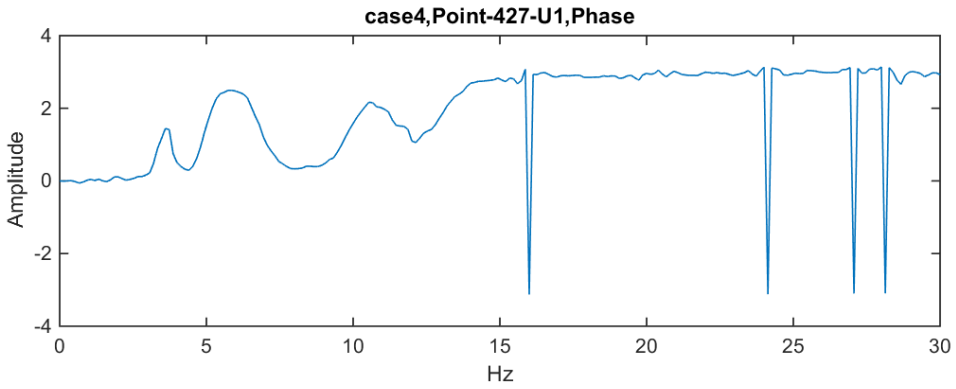

case4,Point-365-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
10
0
5
10
15
20
25
30

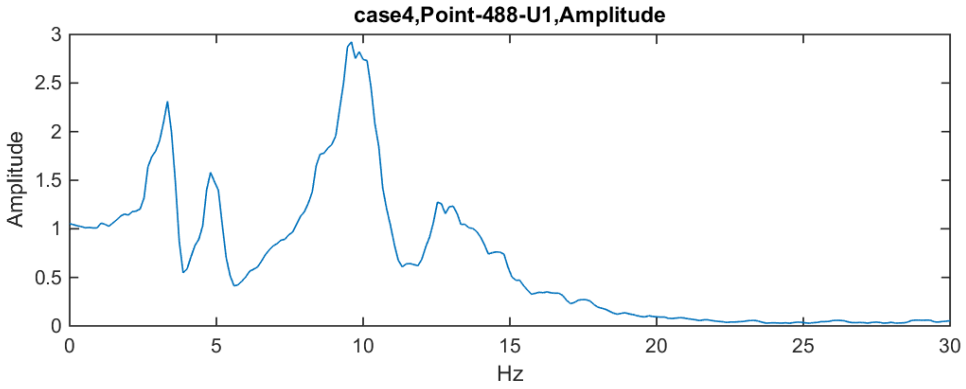

case4,Point-365-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

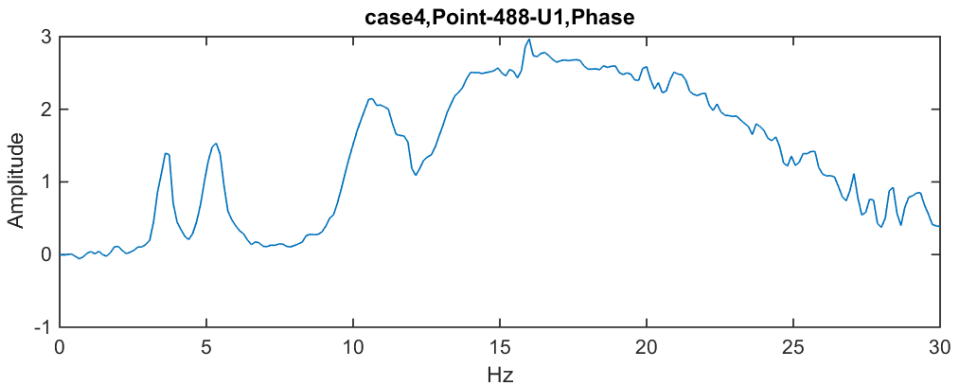

case4,Point-396-U1,Amplitude
Amplitude
Hz
0
2
4
6
8
0
5
10
15
20
25
30

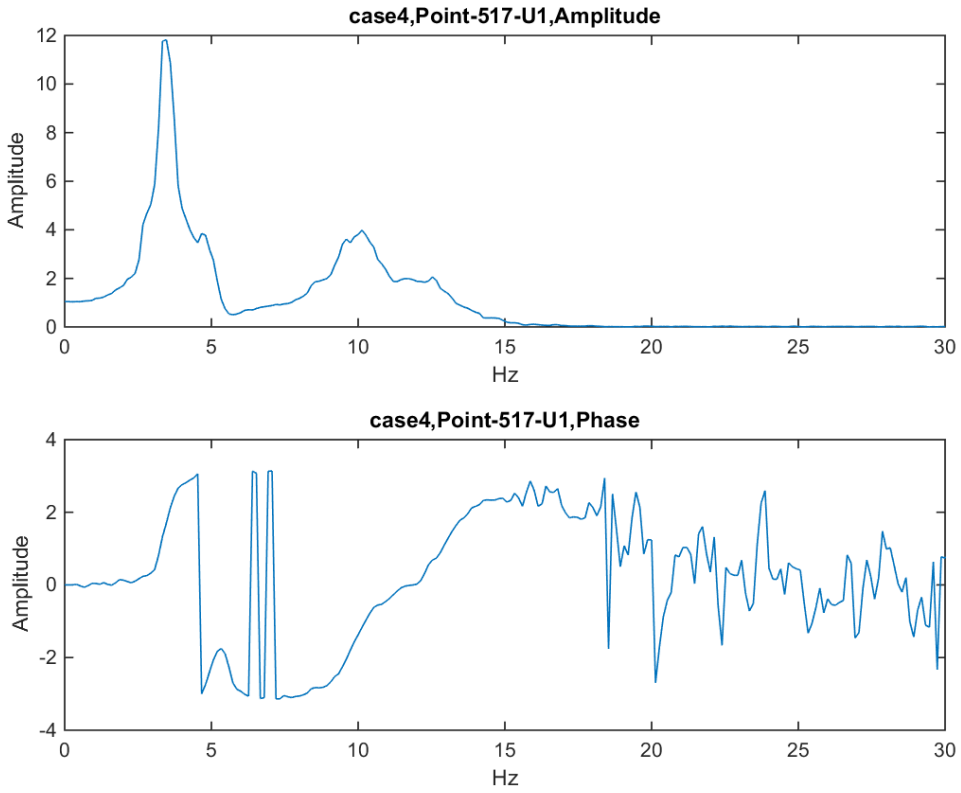

case4,Point-396-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

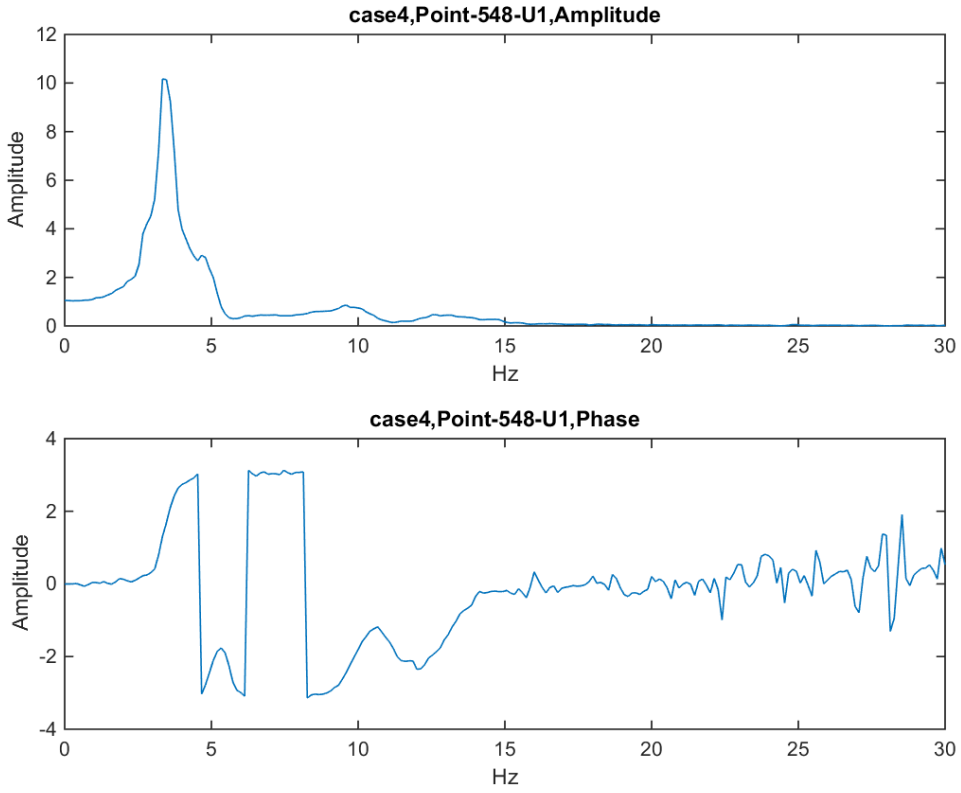

case4,Point-427-U1,Amplitude
Amplitude
Hz
0
1
2
3
4
0
5
10
15
20
25
30

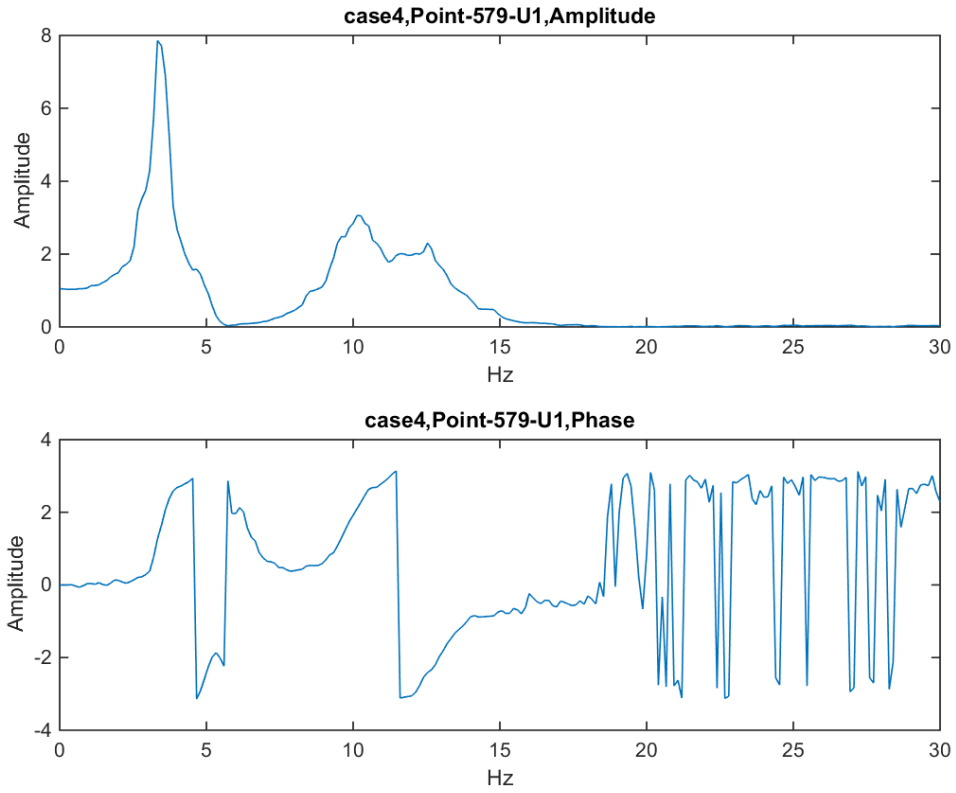

case4,Point-427-U1,Phase
Amplitude
Hz
-4
-2
0
2
4
0
5
10
15
20
25
30

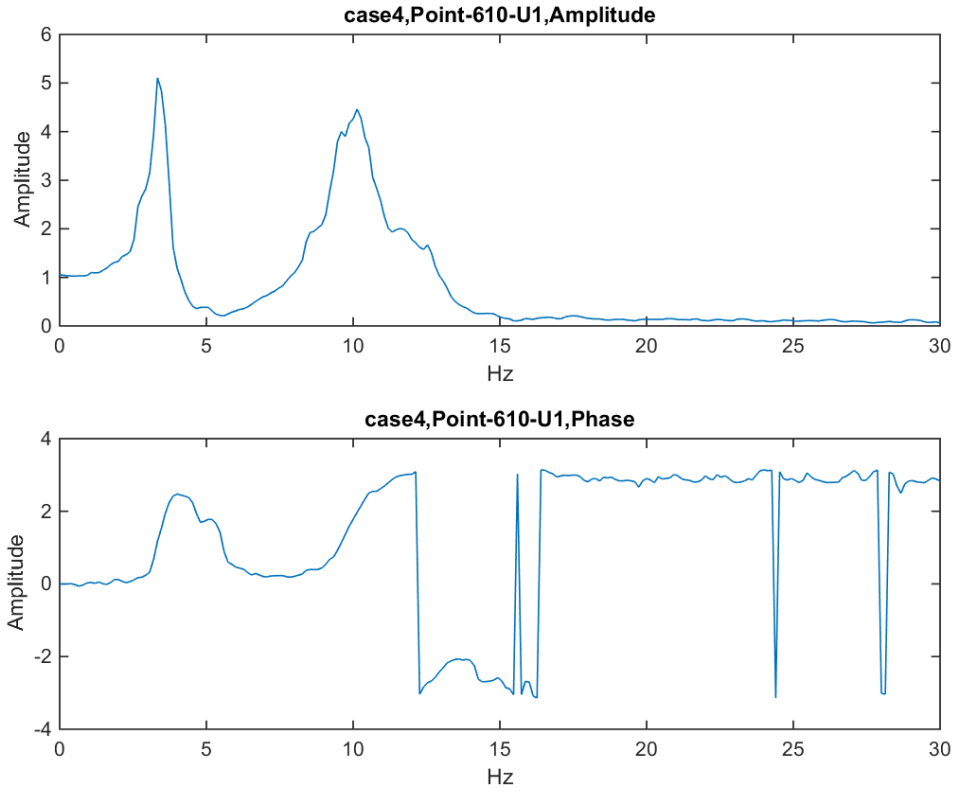

case4,Point-488-U1,Amplitude
Amplitude
Hz
0
0.5
1
1.5
2
2.5
3
0
5
10
15
20
25
30


case4,Point-488-U1,Phase
Amplitude
Hz
-1
0
1
2
3
0
5
10
15
20
25
30


case4,Point-517-U1,Amplitude
Amplitude
Hz
case4,Point-517-U1,Phase
Amplitude
Hz


case4,Point-548-U1,Amplitude
Amplitude
Hz
case4,Point-548-U1,Phase
Amplitude
Hz


case4,Point-579-U1,Amplitude
Amplitude
Hz
case4,Point-579-U1,Phase
Amplitude
Hz


case4,Point-610-U1,Amplitude
Amplitude
Hz
case4,Point-610-U1,Phase
Amplitude
Hz